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THE BEVERAGE WAVE ANTENNA: CURRENTS, CHARGES AND ADMITTANCES

Vol. II. Experimental Measurements

by

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents the results of an experimental and theoretical investigation of the circuit properties of horizontal-wire antennas placed over an imperfectly conducting half-space. Particular emphasis is given to the Beverage wave antenna, a special type of horizontal-wire antenna placed in close proximity to the earth. Earlier work has generally assumed a free-space wave number on the wire, thus neglecting the effect of the half-space. The present study has carefully investigated experimentally the effect of the half-space on the prop-

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20. ABSTRACT (continued)

erties of the antenna (current, charge and input admittance) and has included this effect in all theories discussed.

The theoretical analysis, appearing in Part I of Vol. I, involves several aspects. The theory of King, Shen and Wu for horizontal wires over an imperfectly conducting half-space was verified experimentally. Discrepancies observed in certain cases were attributed to end effects, not accounted for in the theory. Two semi-empirical theories were subsequently developed which included contributions due to end effects. Both provided good agreement with the measured data. The theory of King was extended to include the Beverage wave antenna and comparison with measured results proved quite acceptable.

Distributions of current and charge as well as the input admittance were measured on dipole antennas and on Beverage wave antennas that ranged in length from $.5\lambda_0$ to $1.5\lambda_0$ and were placed at heights of from $.01\lambda_0$ to $.25\lambda_0$ above three different media - fresh water, salt water, and moist earth. A description of the experimental design and system calibration is contained in Part II of Vol. I. The measured data are presented and discussed in Vol. II (Part III of the report). The effects of the wire height and of the parameters of the dissipative medium are noted. Special attention is given to the transmission-line nature of the measured currents and charges and to the measured wave number.

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PART III

EXPERIMENTAL MEASUREMENTS

3.1. Introduction

A systematic study of the horizontal-wire antenna over a dissipative half-space and of the special case of the modified Beverage antenna is presented. The study, which is mainly experimental in nature, is concerned with the electrical characteristics of these antennas and how they are affected by the height of the antenna and the electrical properties of the medium over which the wire is placed. Essentially, this involves measuring the distributions of surface current and charge on these antennas and observing the corresponding effects due to changes in the several parameters.

Theoretically, once the current distribution is known, all the electrical properties of the antenna can be evaluated in a straightforward manner. Due to the complexities of the feeding system, in most current measurements only relative distributions are obtained. To normalize these distributions properly, the characteristics of the feeding system must be determined. For the conventional coaxial-line feed the normalization problem resolves itself into determining the antenna input impedance. Since the input impedance is necessary for an overall understanding of the current distribution, impedance measurements were included in the study.

Another important quantity, the distribution of charge per unit length, can be obtained from the current distribution through the use of the continuity equation. The charge distribution is often used to study the near-zone electric field of the antenna and to obtain a better understanding of the overall electromagnetic interaction of the wire especially near the end and at the driving point. Since the use of the continuity equation involves differentiation of the current, small errors in the measured current can cause large inaccuracies in the calculated charge distribution. To avoid this problem, it was decided to include measurements of the surface charge distribution in the analysis.

In presenting the data, comparisons are made whenever possible between the measured quantities and the associated analytic expressions developed in Part I (Volume I). In fact, one of the major purposes of the experimental analysis is to verify the theoretical work of King [1] and the feasibility of the modified Beverage antenna. The limitations on King's zeroth-order theory and its ranges of applicability are discussed. For certain types of dissipative media the expression for the theoretical wave number given by equation (1.7) can be shown to be in error. This is due primarily to the fact that the basic restrictions given in (1.3a) are violated for these media. Empirical evidence shows that, although the wave numbers are in error, the zeroth-order form for the current and charge distributions are still maintained.

In all cases the measurements are compared either to completely theoretical expressions that are based on the developments in Part I and use (1.7), or to a semi-empirical theory which utilizes the zeroth-order forms for the current, charge and admittance and the measured effective wave numbers. The effective wave number is defined as the wave number observed on the unloaded dipole antenna; corrections for end effects are neglected. If the antenna end effect is small, the effective wave number and the wave number given by (1.7) are identical. For significant end effects the measured wave number will include a contribution due to the end effect. This contribution will primarily affect the observed attenuation on the antenna. Since the end effect is actually a lumped correction occurring at the end of the antenna and the attenuation α_L is a distributed parameter, the use of a measured effective attenuation is clearly only an approximation. For low attenuation and large end corrections this approximation becomes increasingly worse. This approach was taken initially by necessity since the end effects were not well understood and could not be eliminated. It was also believed that the effects would be small.

A second semi-empirical theory was developed subsequently which accounts for both the capacitive end effect and the radiation loss through a complex terminal function θ_s composed of a terminal attenuation function ρ_s and a terminal phase function Φ_s. This approach is described in Section 1.8 of Volume I. The experimentally determined quantities ρ_s and Φ_s correspond, respectively, to the increased magnitude and the shift in α_L that are observed to occur in both the measured data and the theoretical values (based on an effective wave number) compared here in Part III. The slight variations that remain are due to junction effects which were not included in the analysis. Comparisons between this theory and the measured data are in Figs. 1.23 through 1.33 (Volume I).

3.2. Measuring Procedure

The three types of media over which the antennas were placed were fresh water, salt water, and moist earth. They were chosen because they represent the three most common media over which these types of antennas can be used and exhibit a wide range of relative dielectric constants and loss tangents at the operating frequency of 300 MHz. The electrical properties of the three media were measured with the techniques discussed in Part II and were remeasured periodically to ensure uniformity throughout the experiments. In the remaining discussions the terms fresh water, salt water, and moist earth will refer to media with the following electrical properties:

Media	ε_r	σ (mhos/m)	p_e at 300 MHz	Average Temperature °C
Fresh Water	82	.092	.067	17.5
Salt Water	81	3.9	2.885	21.5
Moist Earth	11.4	.0022	.012	$\approx$ 5

The current and charge distributions on monopole antennas over each of these media were measured for heights of d/λ_0 = .01, .02, .05, .1 and .25. At each height three monopole lengths were investigated, namely, h/λ_0 = .5, 1.0, and 1.5. For the Beverage antenna the same combination of antenna spacings and lengths was used by simply connecting the resistive load and the quarter-wave section to the end of the monopole. Hence the overall lengths of the Beverage antennas were $s = .5\lambda_0 + \lambda_L/4$, $\lambda_0 + \lambda_L/4$, and $1.5\lambda_0 + \lambda_L/4$ where for most cases of interest $\lambda_L \neq \lambda_0$.

To ensure that the height of the antennas would remain as uniform as possible for all cases, polyfoam floats were fabricated precisely on a milling machine and were placed under the wire for support. The book value for the relative dielectric constant of the polyfoam was $\varepsilon_r \lesssim 1.04$. The presence of the floats under the wire produced no noticeable effects on the measured currents or input impedances. Since it was still possible that the weight of the antenna could partially submerge the floats, a pulley system was designed to balance the weight of the wire. Nylon string was looped around the wire at three or four positions along its length, passed through a set of pulleys located about 6 ft. above the tank, and then passed through another set of pulleys and counterweighted appropriately at the end. With this arrangement it was possible to place the wire over the floats so that it would just touch the polyfoam but would not exert any weight on it.

The current and charge distributions were measured by moving the loop and monopole probes along the slot cut in the antenna. Connecting the B channel of the vector voltmeter to the probe output and the A channel to a phase reference permits continuous monitoring of the current or charge. For the Beverage antenna it was possible to probe current and charge only up to the resistive load. With the placement of the solid resistor into the line it was impossible to move the probes beyond this point to measure the current and charge on the quarter-wave section. Altshuler [2] has shown that for a similar situation the measured currents on the quarter-wave section are found to be approximately sinusoidal, as would be expected for a resonant element. Thus, by knowing the current or charge distribution up to the resistive load, the distributions on the quarter-wave section can be predicted quite easily. In presenting the data, the theoretical current and charge distributions on the quarter-wave section are included to show the behavior of this current and charge.

The only other limitations in the current and charge measurements were mechanical in nature. Restrictions due to the construction of the line made it impossible to make measurements directly to the end of the antenna or to the junction at the driving point. The charge probe was allowed to come within 1.3 cm of the end of the line while the current probe could get no closer than 1.9 cm. For measurements near the driving point the current probe could come to within .3 cm of the junction and the charge probe could travel to within .9 cm.

The arrangement of the measuring equipment was shown previously in Fig. 2.2(b). The block diagram for the experiment is presented in Fig. 3.1. All equipment was connected through a 25 Watt voltage regulator which isolates the apparatus from any spurious responses or drift in the line voltage. The 300 MHz source consisted of a Hewlett-Packard 3200 B VHF oscillator and an accompanying Hewlett-Packard 230B power amplifier. The oscillator exhibited remarkable stability after a warm-up period of one hour. Frequent checks

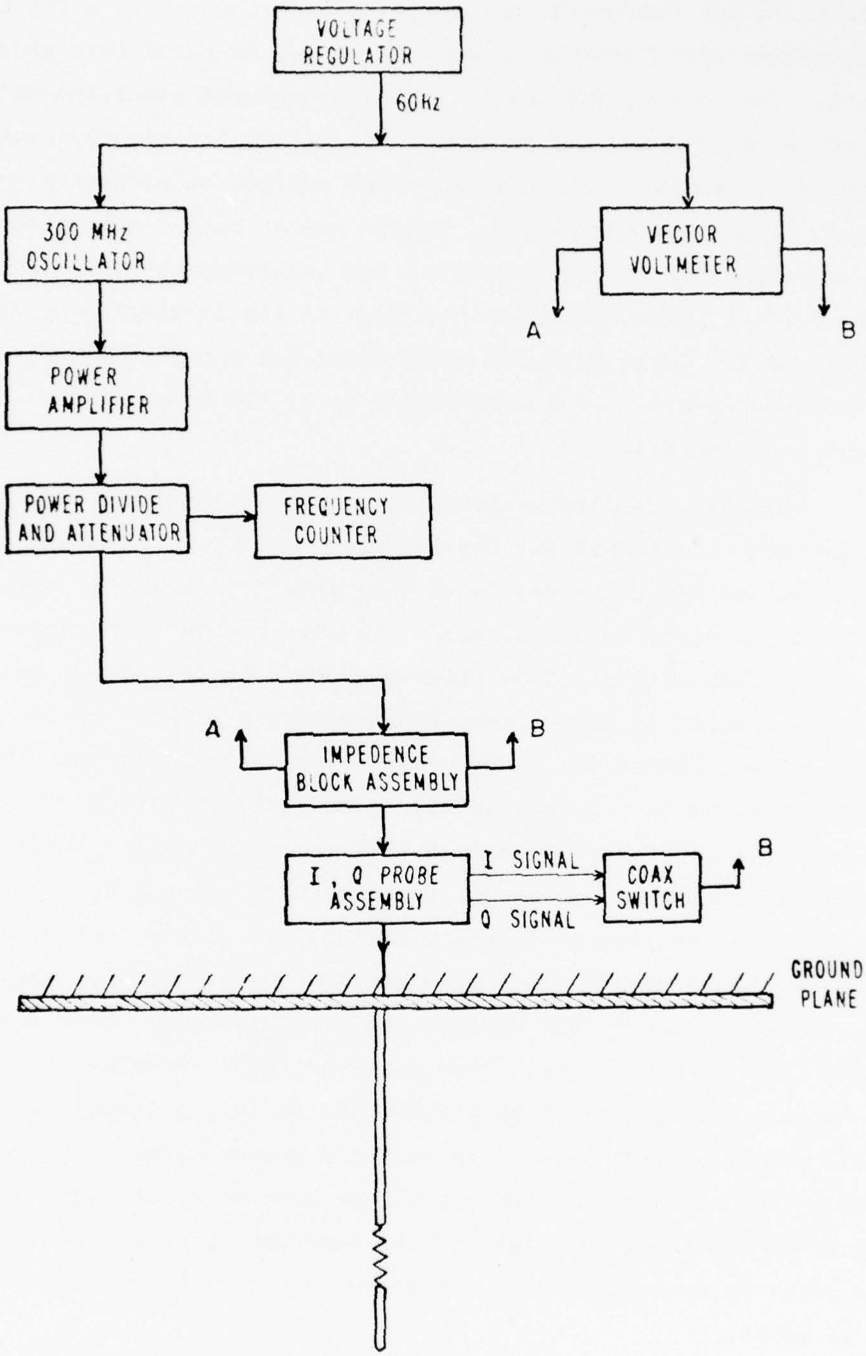


FIG. 3.1. BLOCK DIAGRAM FOR CURRENT, CHARGE AND ADMITTANCE MEASUREMENTS.

were made to detect any power drift in the oscillator and the frequency stability was monitored constantly through the use of a frequency counter. No problem with harmonic generation was encountered throughout the experiment. The current and charge could be measured simultaneously at each position by using a coaxial switch. This eliminated the more time-consuming process of making one complete set of current measurements and then starting again to measure the charge. At the end of each complete current and charge measurement the input-power level was rechecked by measuring the response of the current probe when placed as near to the driving point as possible. This was to ensure that the power level had not changed during the course of the measurements. If a significant power change was recorded, the measurement was repeated.

To be as accurate as possible in making the impedance measurements, the calibration procedure for the impedance block was performed before and after each set of measurements. With the measuring line more than 12 ft. in length, it was a very delicate procedure to connect the line to the ground plane. Even with the line attached to the pulley system, slight variations back and forth or up and down could generate a large amount of torque at the flanged end of the line. Through the use of a level, the line was balanced as accurately as possible before being inserted through the hole in the ground plane. Clamps were then used to hold the line firmly in place and to prevent any sway. Due to the fact that differing amounts of tension were applied to the line while being held by the clamps, variations in the calibration constants of the impedance block were noticed. This was determined to be due to the slight movement off center of the inner conductor of the feed line when the outer conductor was flexed slightly. The impedance probes were found to be very sensitive to this movement and, thus, to alleviate this problem triangular rexolite spacers were inserted into the feed line with care being taken not to include any in the section between the driving point and the plane of the impedance probes. Accuracy was further ensured by rechecking the calibration every time the position of the line was moved.

Impedance measurements were initiated with the longest antenna length and were continued on progressively shorter lengths by withdrawing the antenna into the feed line. With the placement of the polyfoam floats needed for each complete set of impedance measurements, it was much easier to position the floats first and draw in the antenna than it was to increase the antenna length and periodically add more support floats. Since it was still necessary to support the wire with nylon string, the height of the antenna had to be checked each time the length of the antenna was decreased to ensure that excessive tension from the string had not bent the antenna upward from its level position. Over a period of time contact problems developed due to the constant wear from sliding the antenna in and out at the driving point. When the antenna does not make proper contact at the driving point, meter readings become unsteady and erroneous measurements result. To overcome this problem, a thin layer of silver conducting paint was applied to the antenna to provide a tight electrical contact at the driving point. The antenna was repainted before each set of impedance measurements to guarantee good contact along sections where the paint may have worn off.

3.3. Presentation of Measured Data for a Dipole Antenna Above a Dissipative Half-Space

The measurements for a dipole antenna placed above a variety of dissipative media are presented in this section. The section will be divided into three parts for the three different media treated (fresh water, salt water, and moist earth). The current and charge data are presented in order of increasing d/λ_0 spacings. For each spacing measurements are presented for antenna lengths of $1.5\lambda_0$, λ_0 and $.5\lambda_0$. All measurements are compared either to King's theory [1] when valid or to a semi-empirical theory based on the measured effective wave number. Data points were measured every 2.5 cm and numbered 61, 41 and 21, respectively, for antenna lengths of $1.5\lambda_0$, λ_0 and $.5\lambda_0$. This number of data points for each length was shown to provide sufficient resolution to represent the actual current and charge distributions accurately.

The measured data were normalized to the accompanying theoretical curve at $z/h = .2$ or to a smooth part of the curve in the immediate vicinity of this point. Normalization to the driving point at $z = 0$ by means of the measured input admittance was not attempted owing to the problems involved with the junction effects [3]. In some cases end effects did not permit normalization at $z/h = .2$. In these situations the data were normalized by aligning the peaks of the magnitude curve. Further discussion on this and the end-effect problem is given in Section 3.5.

The admittance data are presented in both the rectangular-plot form with $\beta_L h$ as the independent variable and in the circular-diagram form. For each respective medium the admittances are presented in order of increasing d/λ_0 spacing. All admittance measurements are made for monopole lengths ranging from $.013\lambda_0$ to $1.5\lambda_0$ (1.3 cm to 150 cm) and were recorded at intervals of 2.5 cm. An interval of this size was small enough to provide an accurate representation of the input admittance. The admittance curves display the apparent input admittance uncorrected for junction effects. King has shown [4] that when a monopole is driven by a coaxial line through a ground plane, a negative terminal-zone capacitance with admittance $Y_T = j\omega C_T$ must be added to the measured apparent admittance, Y_{in}, to give the actual admittance of the isolated monopole, $Y_{monopole}$. Hence,

$$Y_{in} = Y_{monopole} + j\omega C_T \tag{3.1}$$

where C_T is determined from curves in [4] for b/a = 2.3, C = 133.2 pF/m to be:

$$C_T = -.423 \text{ pF} \tag{3.2}$$

Note that C_T includes the effect of the rexolite spacer ($\epsilon_r = 2$) at the driving point. At the operating frequency of 300 MHz, the terminal-zone admittance Y_T is:

$$Y_T = j\omega C_T = -j.814 \text{ millimhos} \tag{3.3}$$

It is apparent that the terminal-zone correction affects only the susceptance and that the measured conductance values are unaltered.

Fresh-Water Measurements

The fresh-water solution used for these measurements corresponds to solution number 2 in Section 2.5. The electrical properties were measured to be $\epsilon_r = 82$ and $\sigma = .092$ mhos/m at 20° C. During the course of these measurements the temperature of the fresh water varied between 15° C and 20° C. For the measurements taken at $d/\lambda_0 = .01$, the water temperature was initially 20° C. The water gradually cooled so that for the final measurements at $d/\lambda_0 = .25$, the temperature was recorded at 15° C. Measurement of the electrical properties of the water at both these temperatures revealed no noticeable change. This agrees with previous investigations [5] made over a similar temperature range.

The measured current and charge distributions are presented in Figs. 3.2 through 3.18. The measured data are represented by dots. Tabulation of the normalized data and the raw data is given in Appendix B. An examination of these curves reveals the following important results:

1) For $d/\lambda_0 = .01$ and $.02$ (Figs. 3.2 through 3.7) the measured current and charge are compared with the theoretical expression developed by King [equations (1.6) and (1.18) with (1.7)]. The agreement is seen to be quite good for all antenna lengths. For $d/\lambda_0 = .01$ the measured wave number is within 1% of the theoretically predicted wave number of (1.7); while for $d/\lambda_0 = .02$ the wave numbers are within 3% with still very acceptable results. Departure from the theory is evident at the driving point and at the end of the antenna. These variations are due to the junction effect at the driving point and to the antenna end effect, neither of which can be taken into account in the zeroth-order theory of King. It is interesting to note that one of the initial restrictions on this theory is that $\beta_0 d << 1$ [equation (1.5)]. The fact that at $d/\lambda_0 = .02$ the agreement is still good implies that this condition is not as restrictive as originally presumed. This would agree with the subsequent restriction on the size of h/d.

2) At $d/\lambda_0 = .05$ and $.1$, significant differences begin to arise in the comparison between theory and experiment. The disagreement occurs mainly in α_L, the attenuation constant, where the theoretical value for α_L is found to be significantly smaller than the measured effective value. This is observed in Figs. 3.8 and 3.12 which compare King's theory to the experimental data. The deeper theoretical nulls reflect the discrepancy in the attenuation. For $d/\lambda_0 = .1$ noticeable departure in the phase constant β_L is also observed. At these heights the measured data appear to be shifted toward the end of the line. This is due to the end effect of the line which makes the antenna appear to be longer than it is. The shift is not due to any error in the wave number. A further discussion on end effects will be postponed until Section 3.5. For $d/\lambda_0 = .05$ and $.1$, errors in α_L of 20% and 50%, respectively, were considered unacceptable. Without further confirmation, it was believed that the large discrepancies between the theoretical attenuation

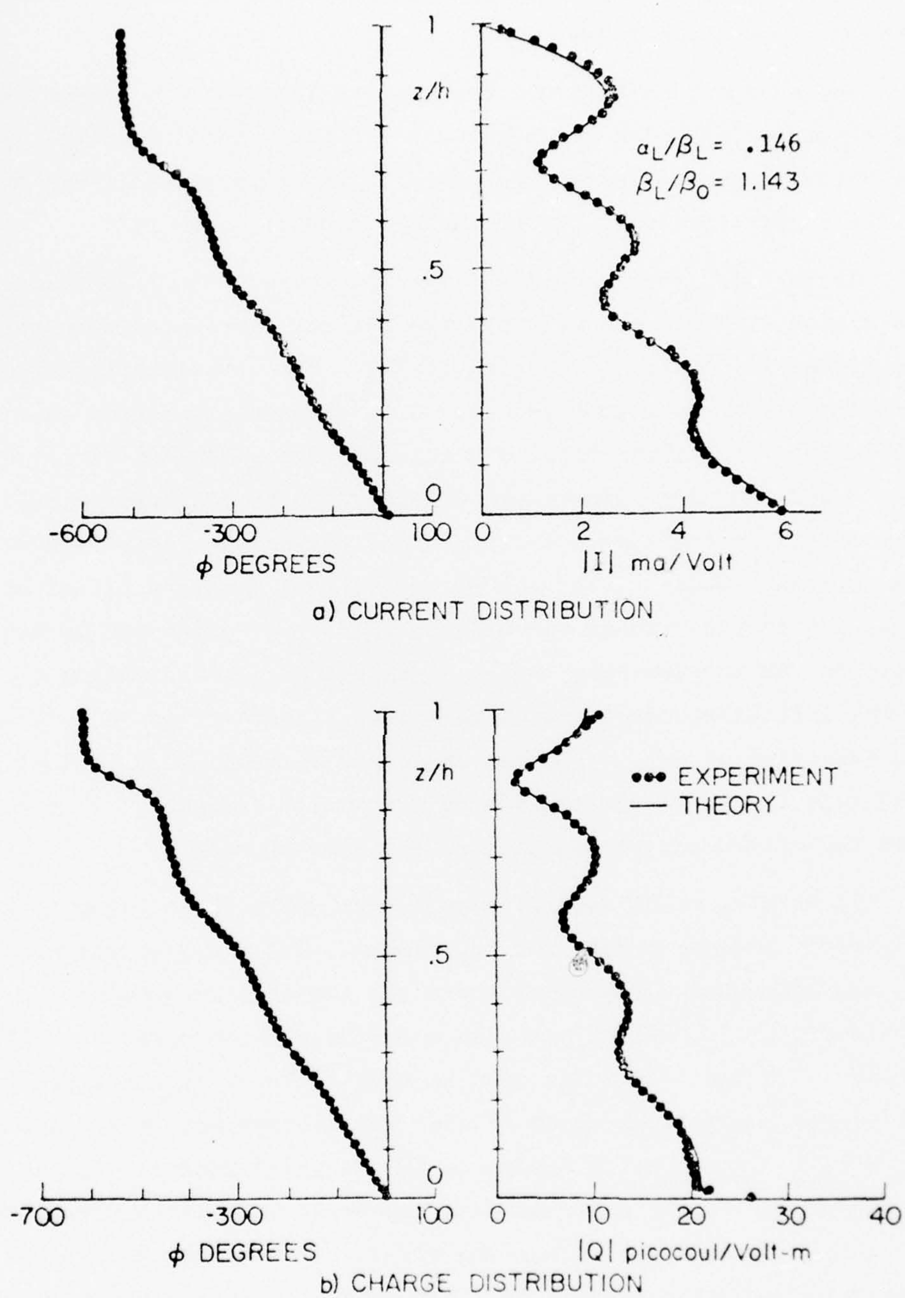


FIG. 3.2. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$

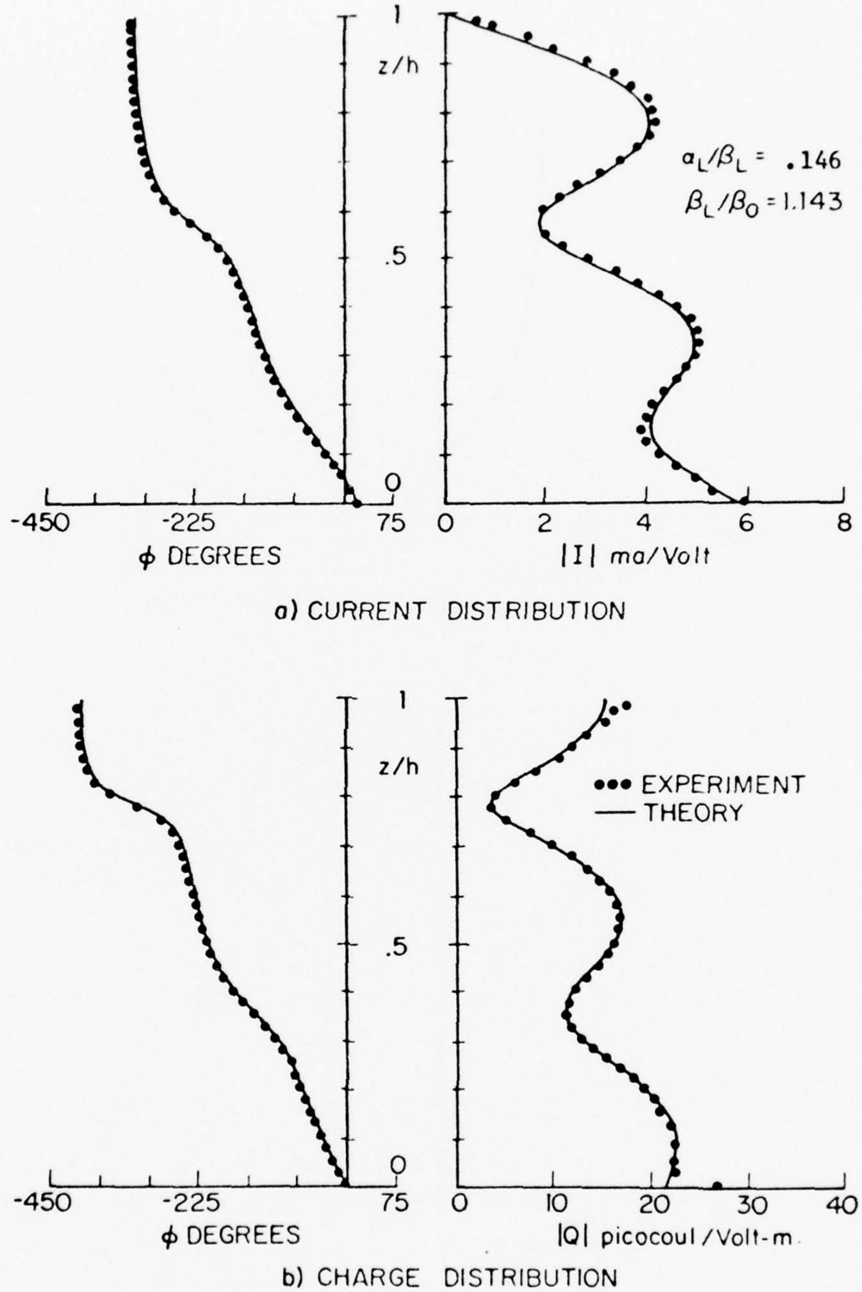


FIG. 3.3. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

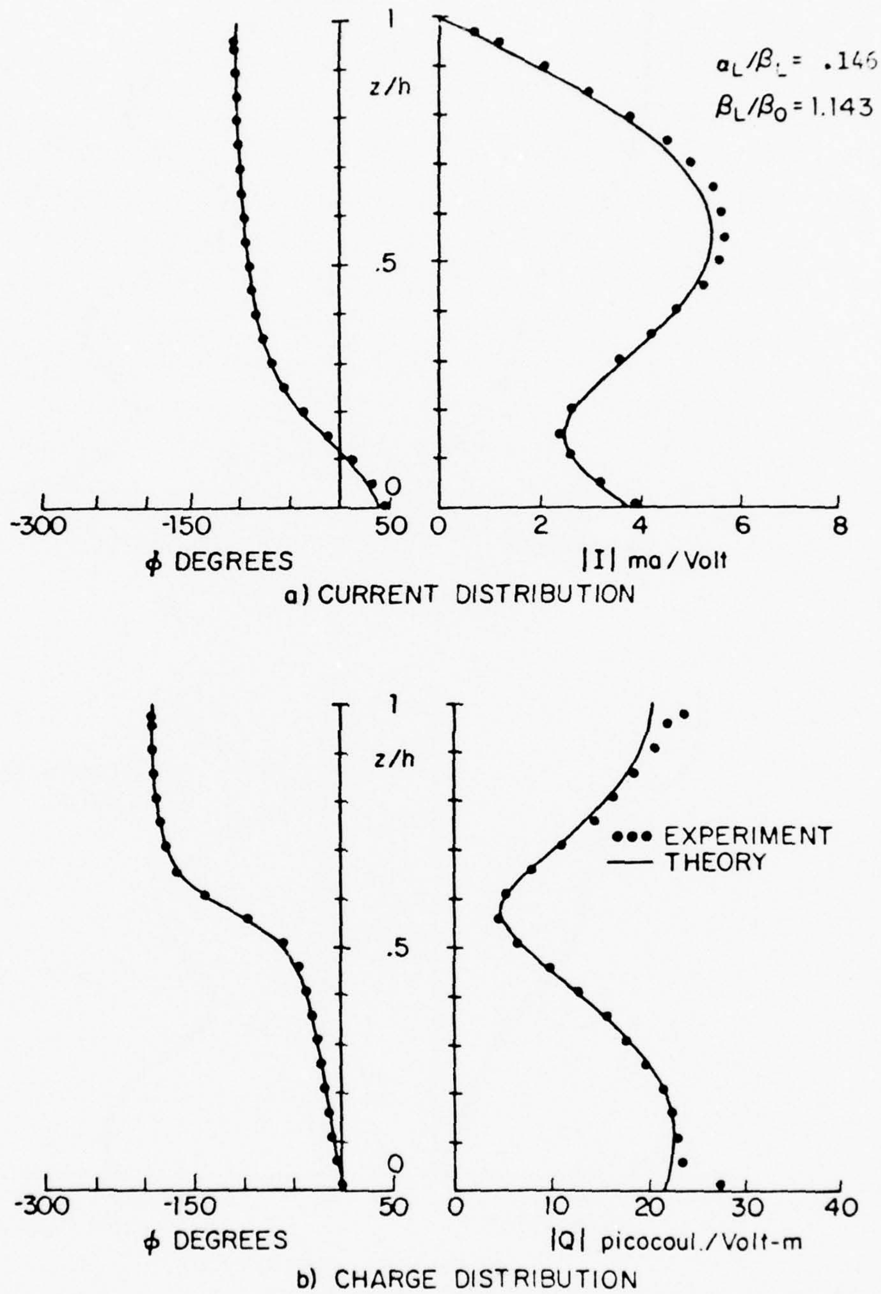
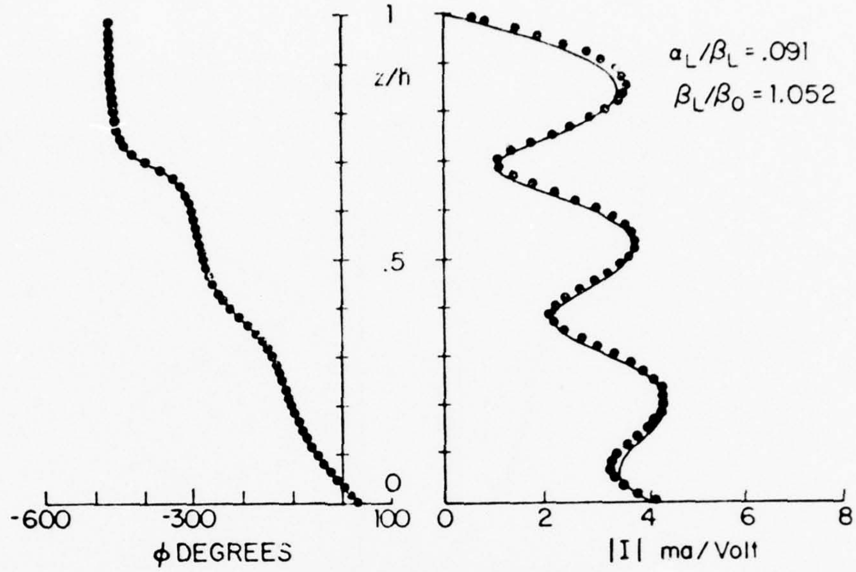
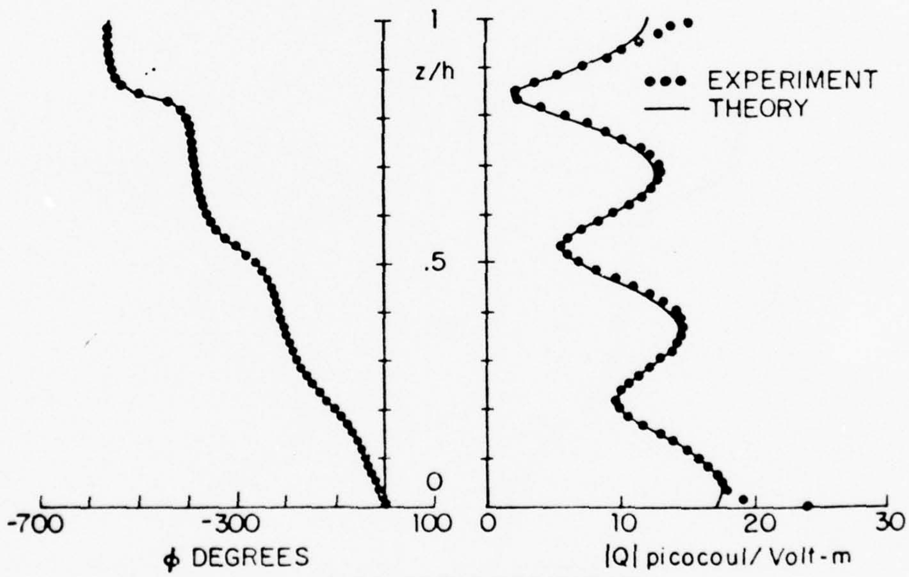


FIG. 3.4. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .01$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.5. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

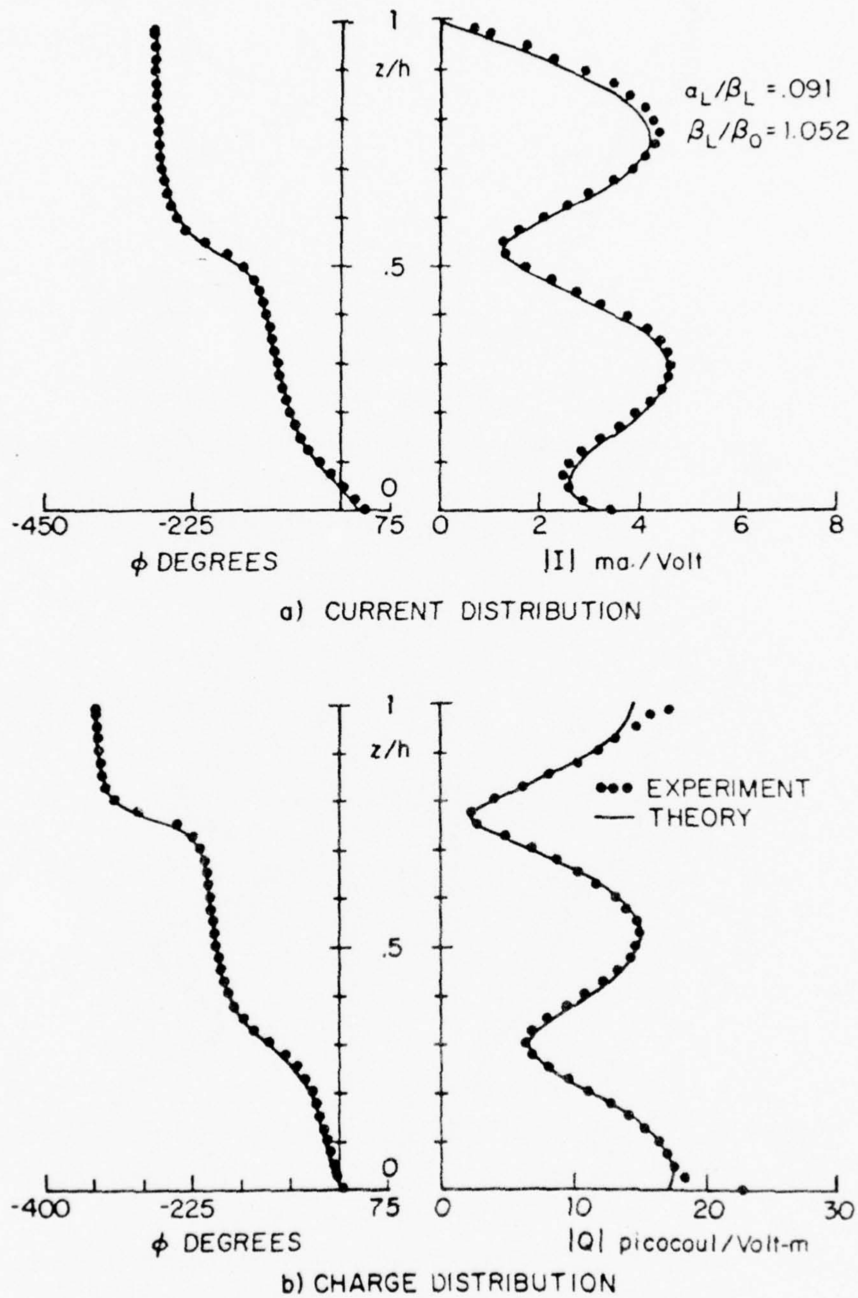


FIG. 3.6. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

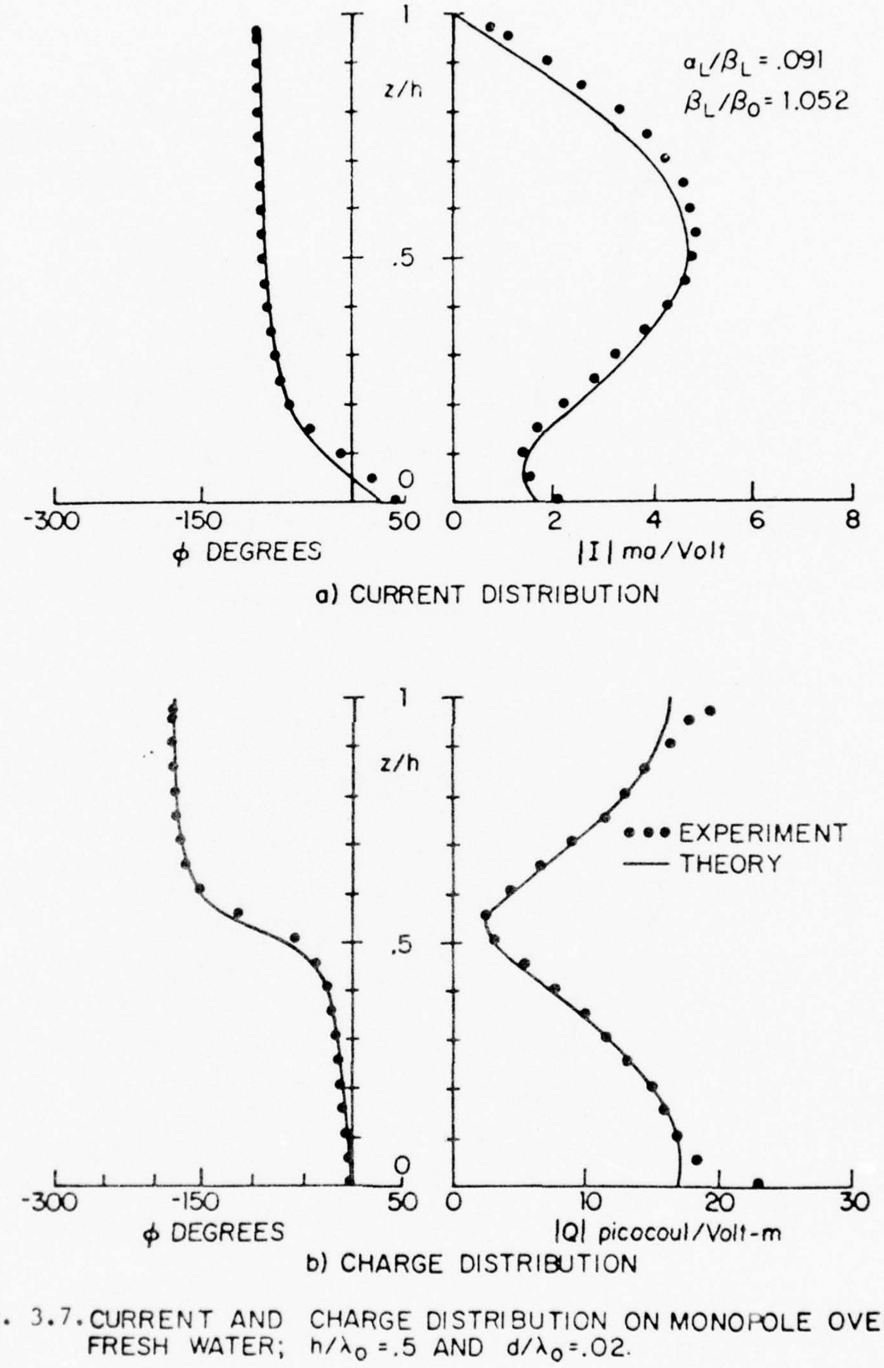


Fig. 3.7. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

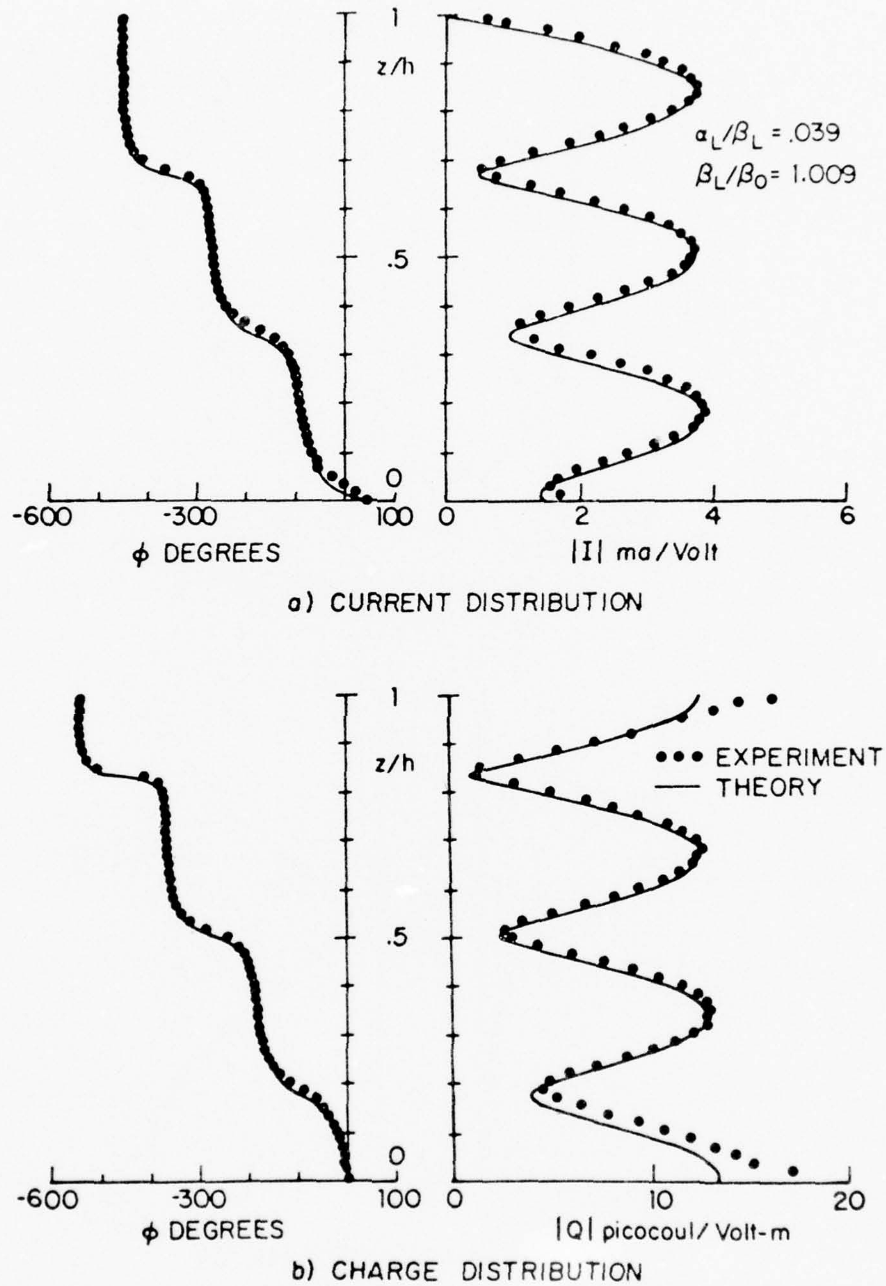


FIG. 3.8. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING THEORETICAL WAVENUMBER; h/λ_0 = 1.5 AND d/λ_0 = .05.

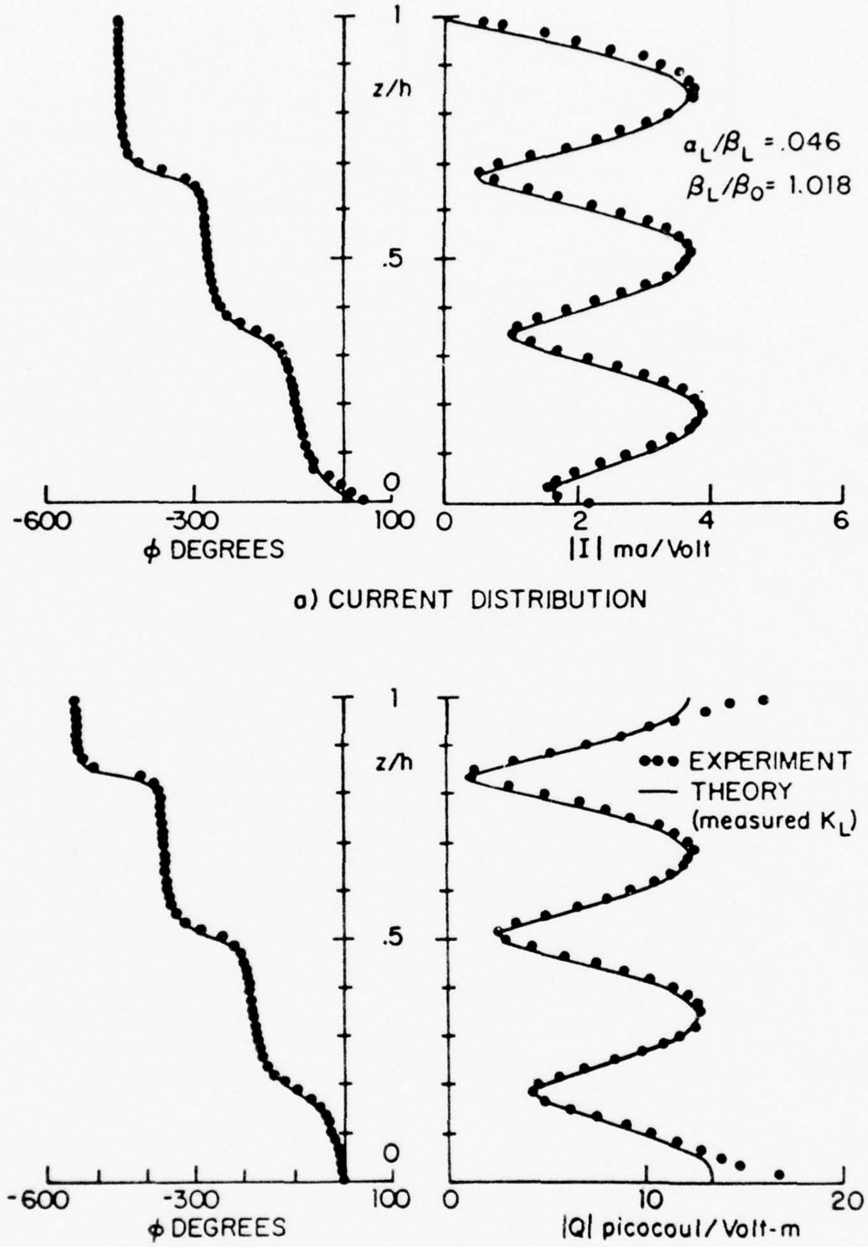


FIG. 3.9. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; h/λ_0 AND d/λ_0 =.05.

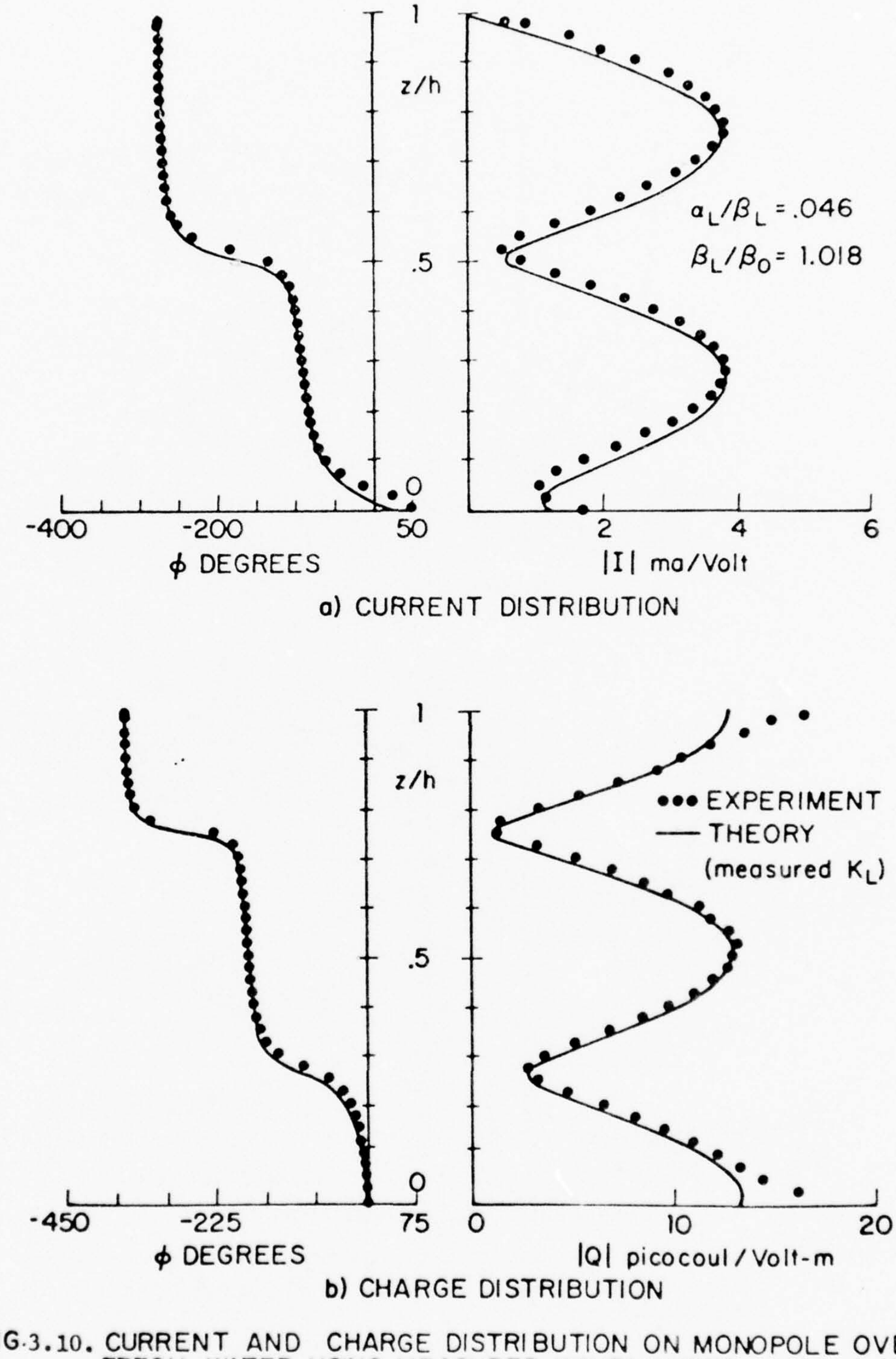
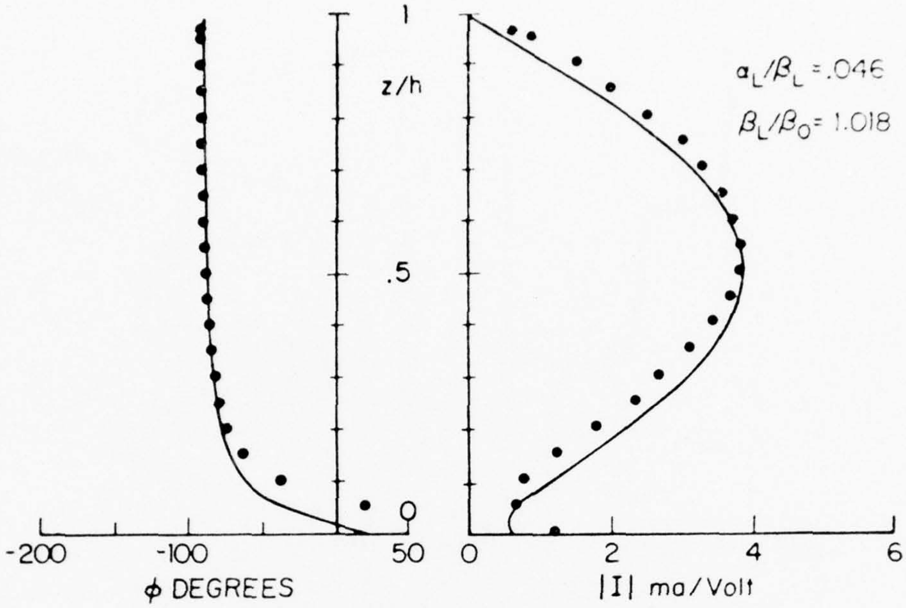
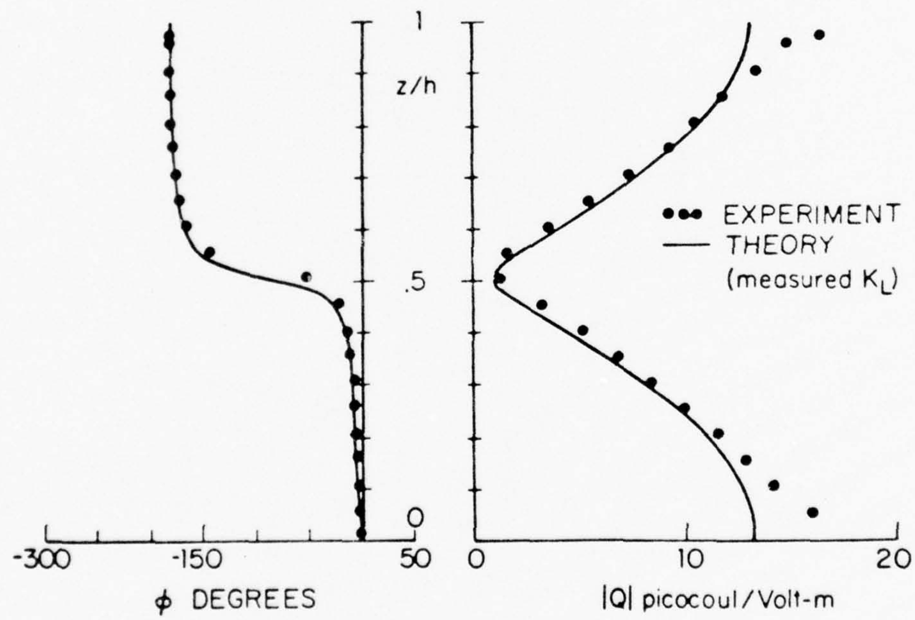


FIG.3.10. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.11. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

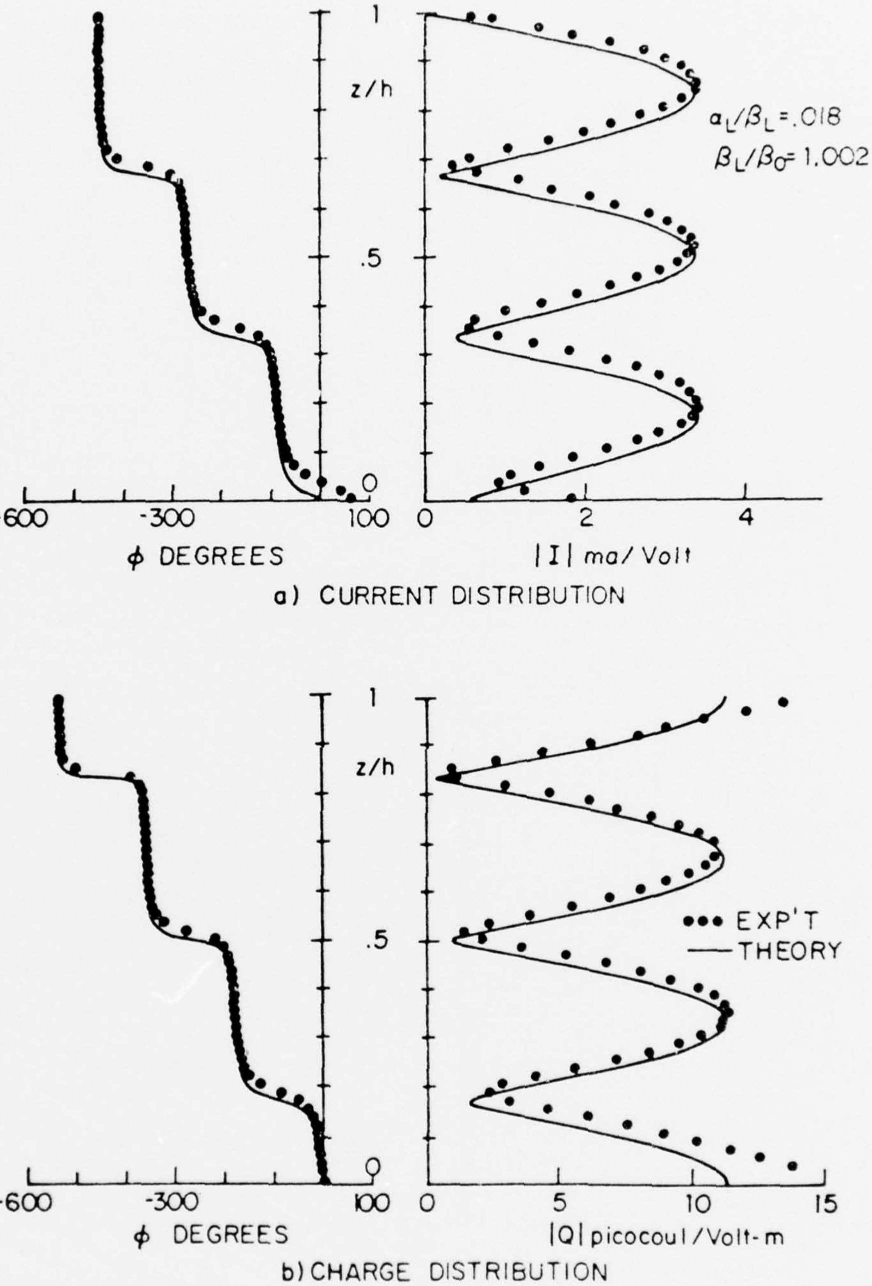


FIG. 3.12 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING THEORETICAL WAVE NUMBER; h/λ_0 = 1.5 AND d/λ_0 = 1.

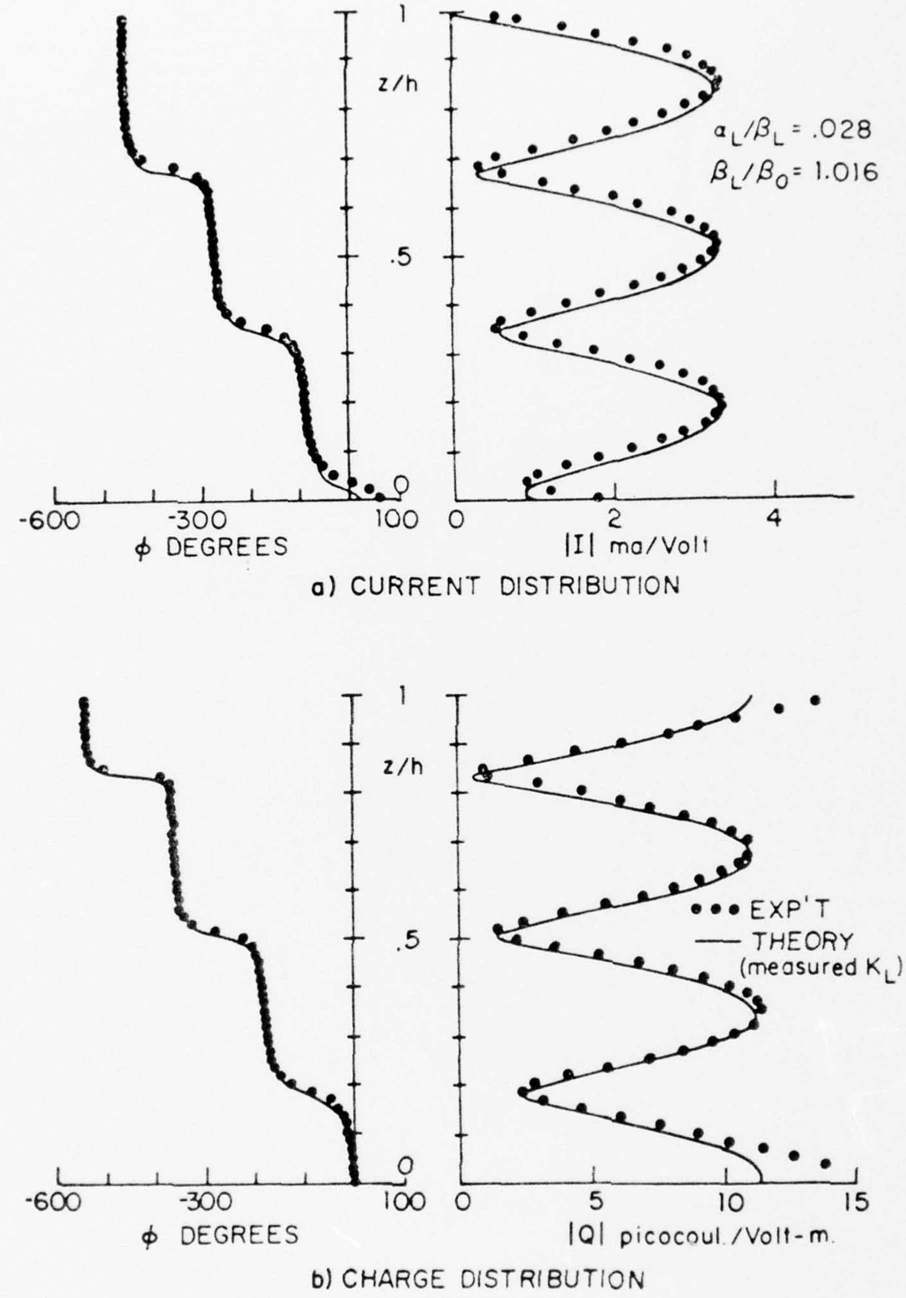


FIG. 3.13 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = 1$.

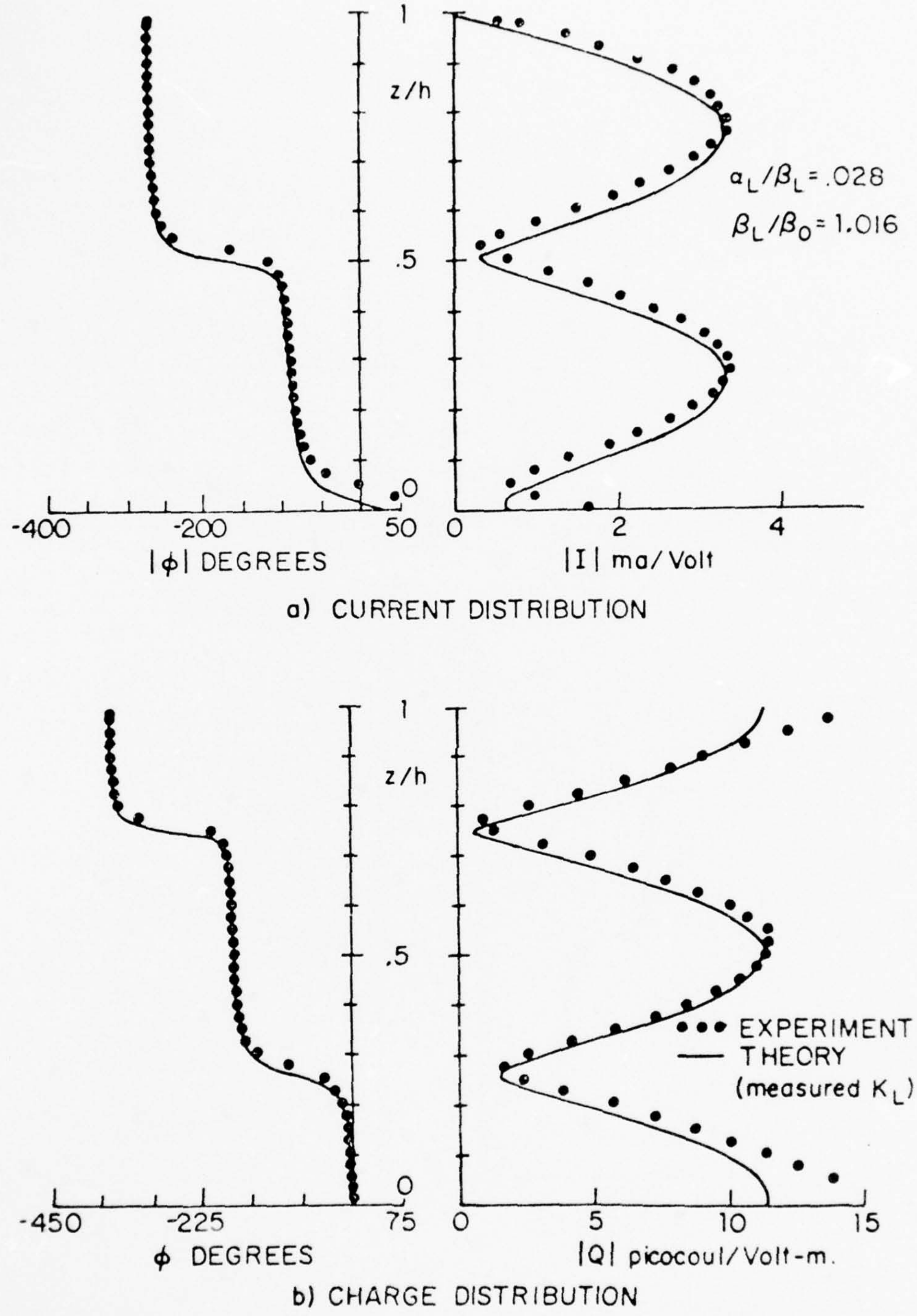


FIG.3.14. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

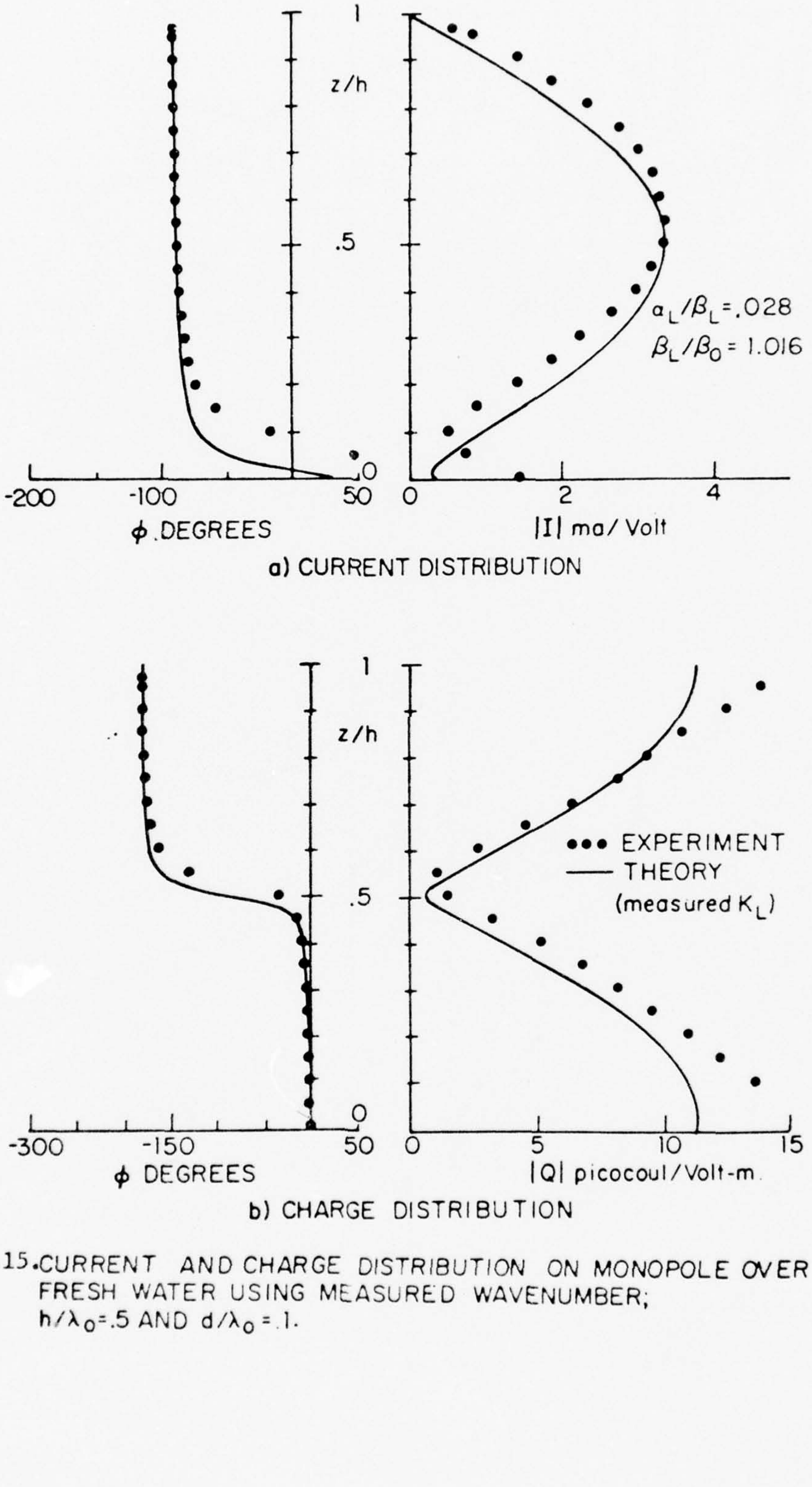
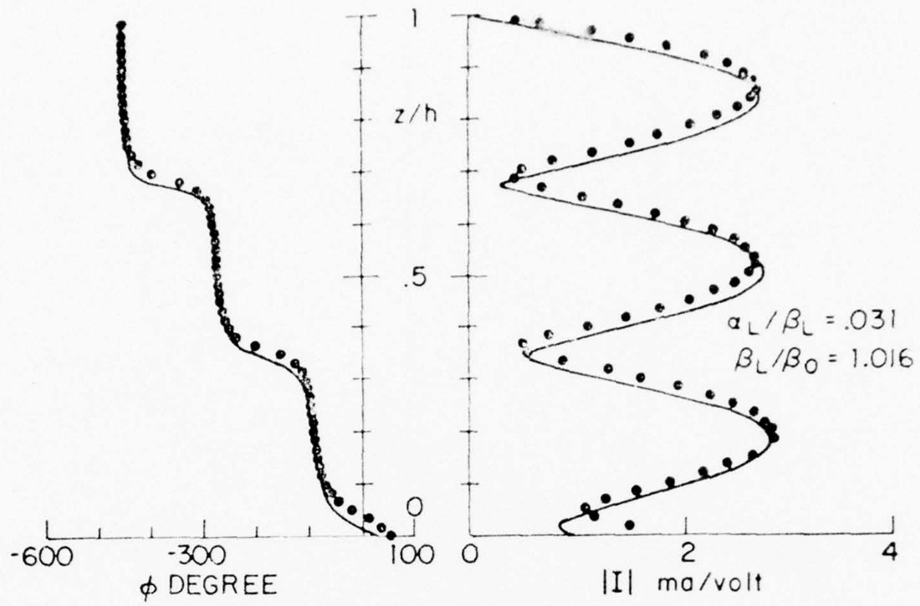
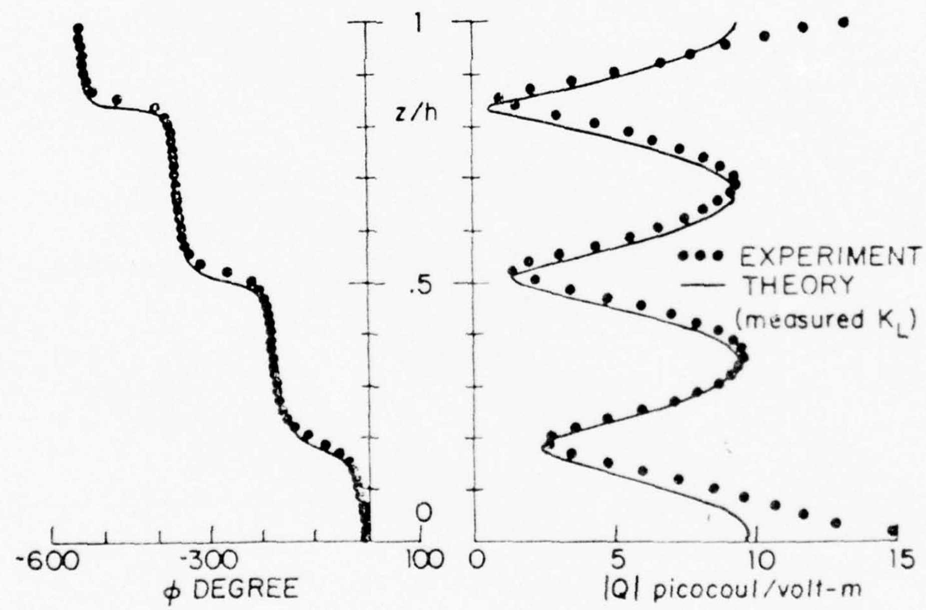


FIG.3.15. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; h/λ_0=.5 AND d/λ_0=.1.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.16. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; h/λ_0 = 1.5 AND d/λ_0 = .25.

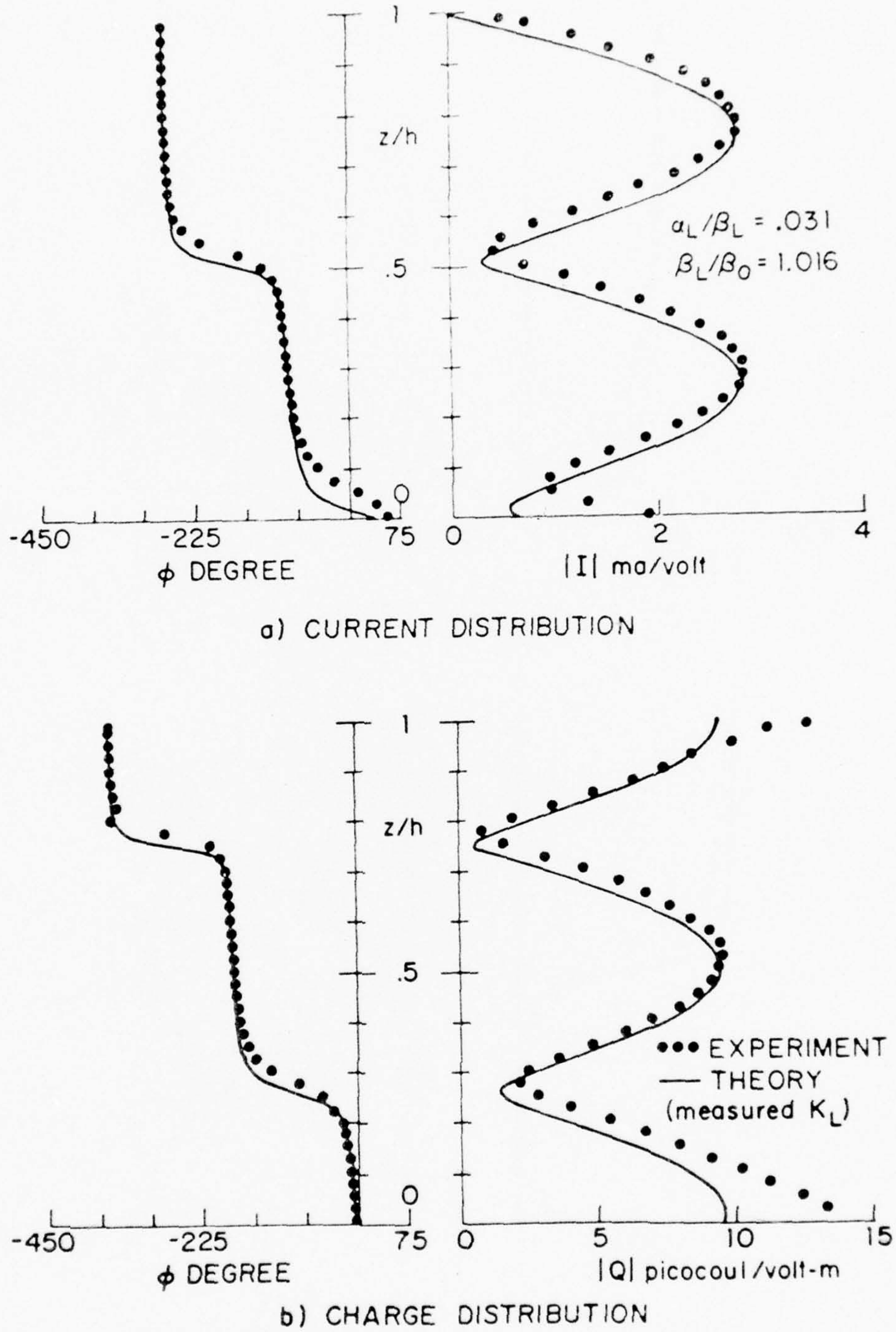


FIG.3.17. CURRENT AND CHARGE ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.

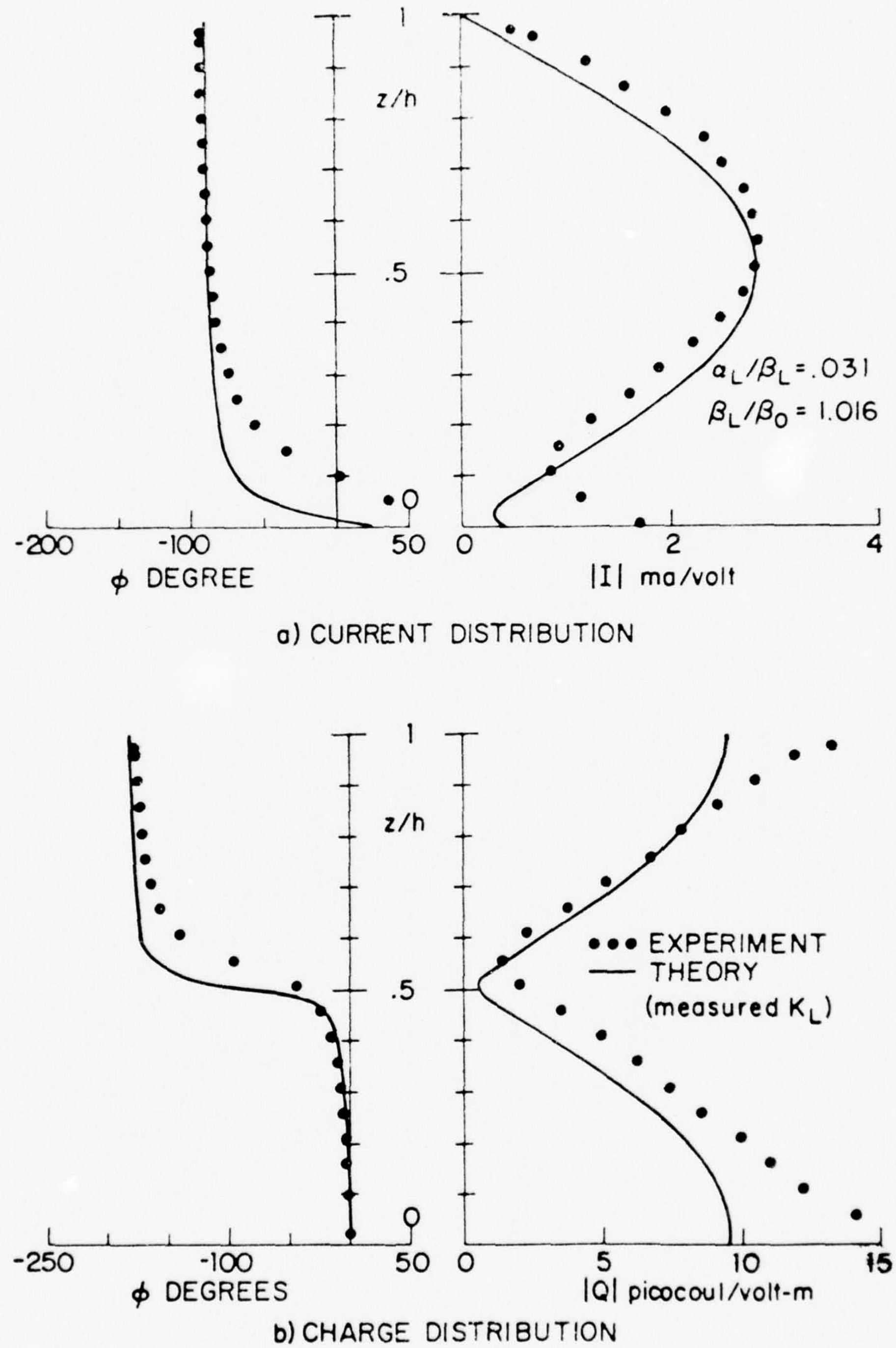


FIG. 3.18. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .25$.

given by (1.7) and the measured attenuation could depend on one or both of the following. The possibility that a fundamental limitation exists in the d/λ_0 quantity is strong. Speculation that the d/λ_0 quantity is unimportant as long as h/λ_0 is large may be plausible, but exactly how large h/λ_0 must be is not specifically known. It is quite possible that for the cases being studied the transmission-line-like behavior may diverge at this height. The second possibility is that a significant end effect is present which would cause the effective attenuation to be higher than the theoretical value. Since the slight shift in the measured data could be caused by the end effect, there is strong evidence in this direction. This problem is discussed in Section 1.8 (Volume I) where it is determined that the discrepancies are due to the end effect. In any case, to overcome this problem a semi-empirical solution was developed which utilizes the zeroth-order form for the current and charge derived by King with the measured effective wave number obtained from the experiment. The comparison between this solution and the measurements is given in Figs. 3.9 through 3.11 and 3.13 through 3.15. The figures show that the zeroth-order form still holds and that by using the measured effective wave number the corresponding results are quite good.

3) At the highest spacing, $d/\lambda_0 = .25$, the semi-empirical solution was also used. The results are presented in Figs. 3.16 through 3.18. It appears that at this height the forms of the current and charge begin to depart somewhat from the sinusoidal. This is especially apparent near the driving point. It would seem that at this height the influence of the medium is diminishing and the form of the current and charge is approaching that of an isolated antenna. Alternatively, it is quite possible that the end correction is sufficiently large to give this appearance. In either case, the semi-empirical solution still provides good approximate representations for the current and charge.

In Fig. 3.19 the theoretically predicted wave numbers from (1.7) for an antenna over fresh water are compared with the measured effective wave numbers obtained from the previous data. Note that for the β_L/β_0 curve all measured values are within 5% of the theoretical curve. For the α_L/β_L curve, however, the agreement is good only for the two cases of $d/\lambda_0 = .01$ and $.02$. At heights of $d/\lambda_0 = .05$ and greater, the error in α_L exceeds 20%, as is easily seen from the comparison in Fig. 3.19.

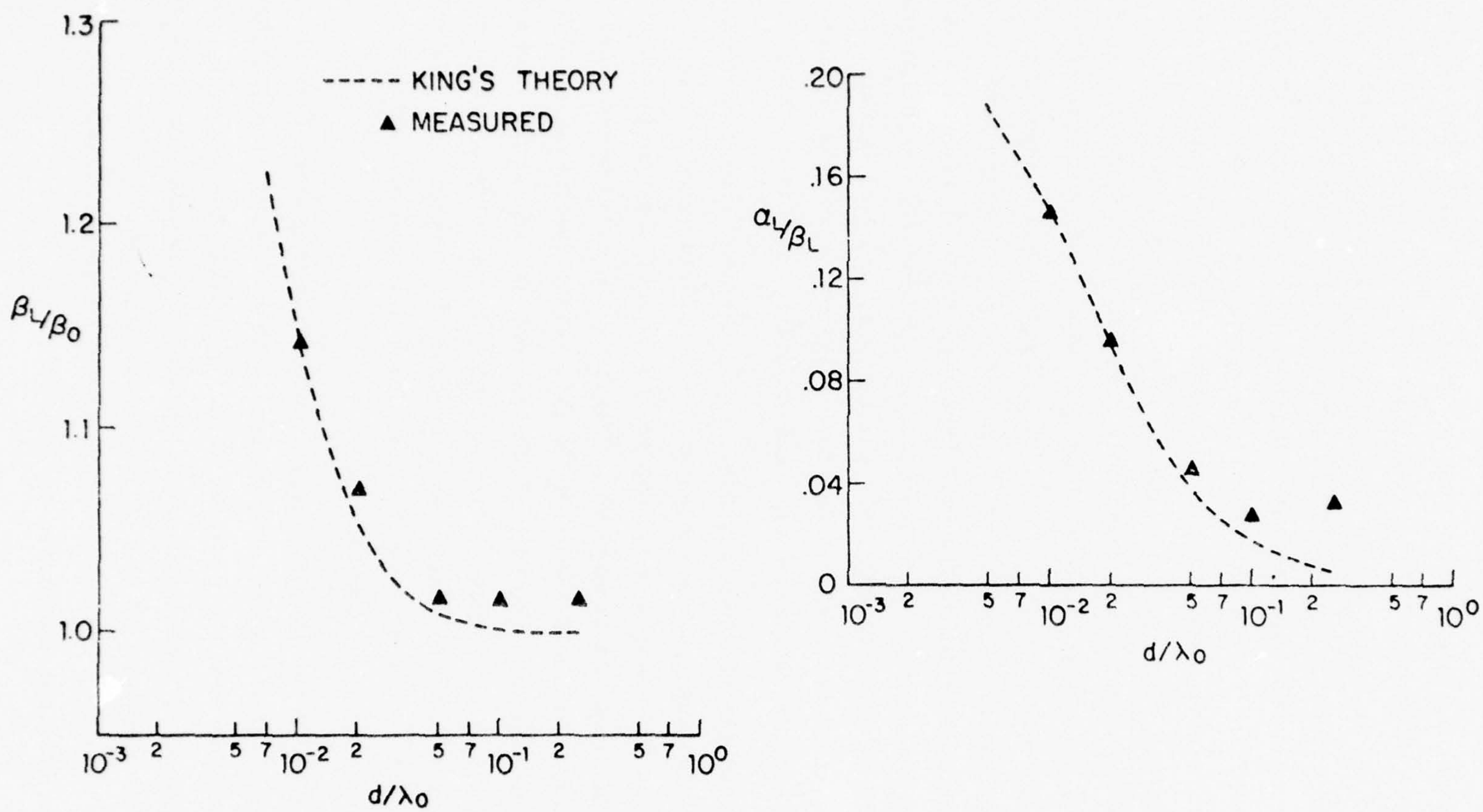


FIG. 3.19. WAVENUMBER ON HORIZONTAL WIRE OVER FRESH WATER;
$\varepsilon_r = 82$ AND $P_e = .067$

The measured effective wave numbers were obtained by using standard transmission-line techniques. At each height the difference between charge nulls was measured on an antenna, $1.5\lambda_0$ in length, to determine the phase constant β_L of the line. The measurements were made at the nulls because they tend to be much more sharply defined than the peaks of the curve, resulting in better accuracy. The charge distribution was measured rather than the current since the charge probe has less of an averaging effect than the current probe. The attenuation constant was determined by measuring the position of the peaks and nulls of the current distribution as well as the magnitude of the current at these points and then utilizing the following relationship:

$$\mathrm{ISWR} = \frac{|I|_{max}}{|I|_{min}} = S_I = \frac{\cosh(\alpha_L w_1 + \rho_s)}{\sinh(\alpha_L w_2 + \rho_s)} \tag{3.4}$$

where ρ_s, the terminal attenuation function, is equal to zero for an open circuit with no appreciable end effect and w_1, w_2 are the distances from the end of the antenna to the current peak and null, respectively.

With S_I, w_1 and w_2 determined experimentally, α_L can be solved for by iteration. Equation (3.4) was programmed on a Hewlett-Packard 9821A calculator to obtain the desired results for α_L. For significant end effects, ρ_s is no longer zero and the α_L solved for is not the true attenuation but an effective value which includes a contribution due to ρ_s. When ρ_s is comparable in magnitude to $\alpha_L h$, the concept of an effective α_L cannot be used. It turns out that this is the situation that exists for $d/\lambda_0 = .25$. This special case is discussed in detail in Section 1.8 in Volume I.

The input admittance measurements for a monopole over fresh water are shown in Figs. 3.20 through 3.24 with the corresponding circle diagrams in Figs. 3.25 through 3.29. At $d/\lambda_0 = .01$ and .02, the measured input admittance is compared with the theoretical admittance obtained by King in (1.16). As with the current and charge distributions, the agreement between experimental and predicted results is good considering that the zeroth-order theory contains no corrections for end or junction effects. In the other three cases, $d/\lambda_0 = .05$, .1, and .25, the measured data are compared with the transmission-line form for the admittance given by (1.16) with the measured

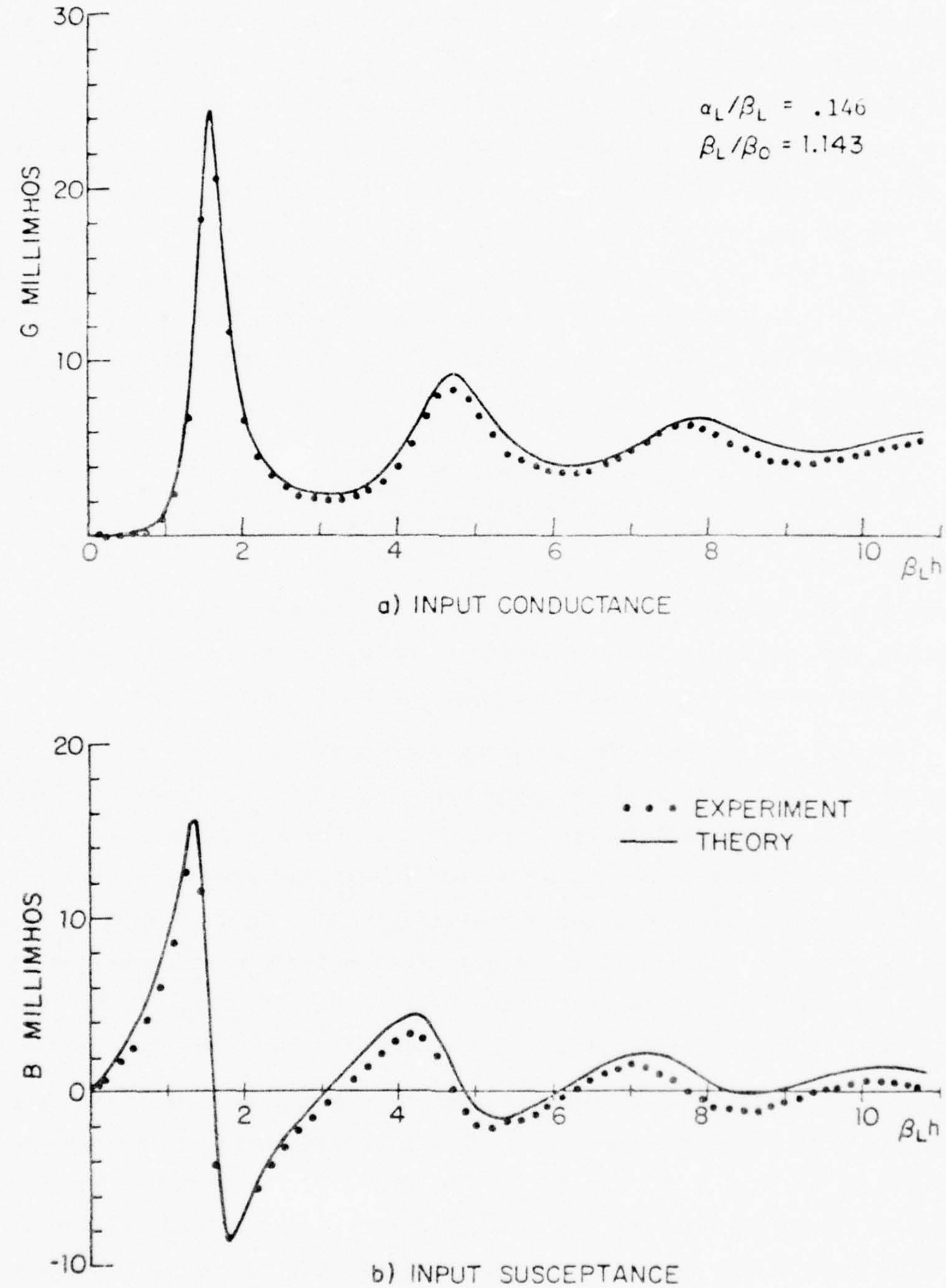


FIG. 3.20. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER; d/λ_0 = .01 AND a/λ_0 = .0015

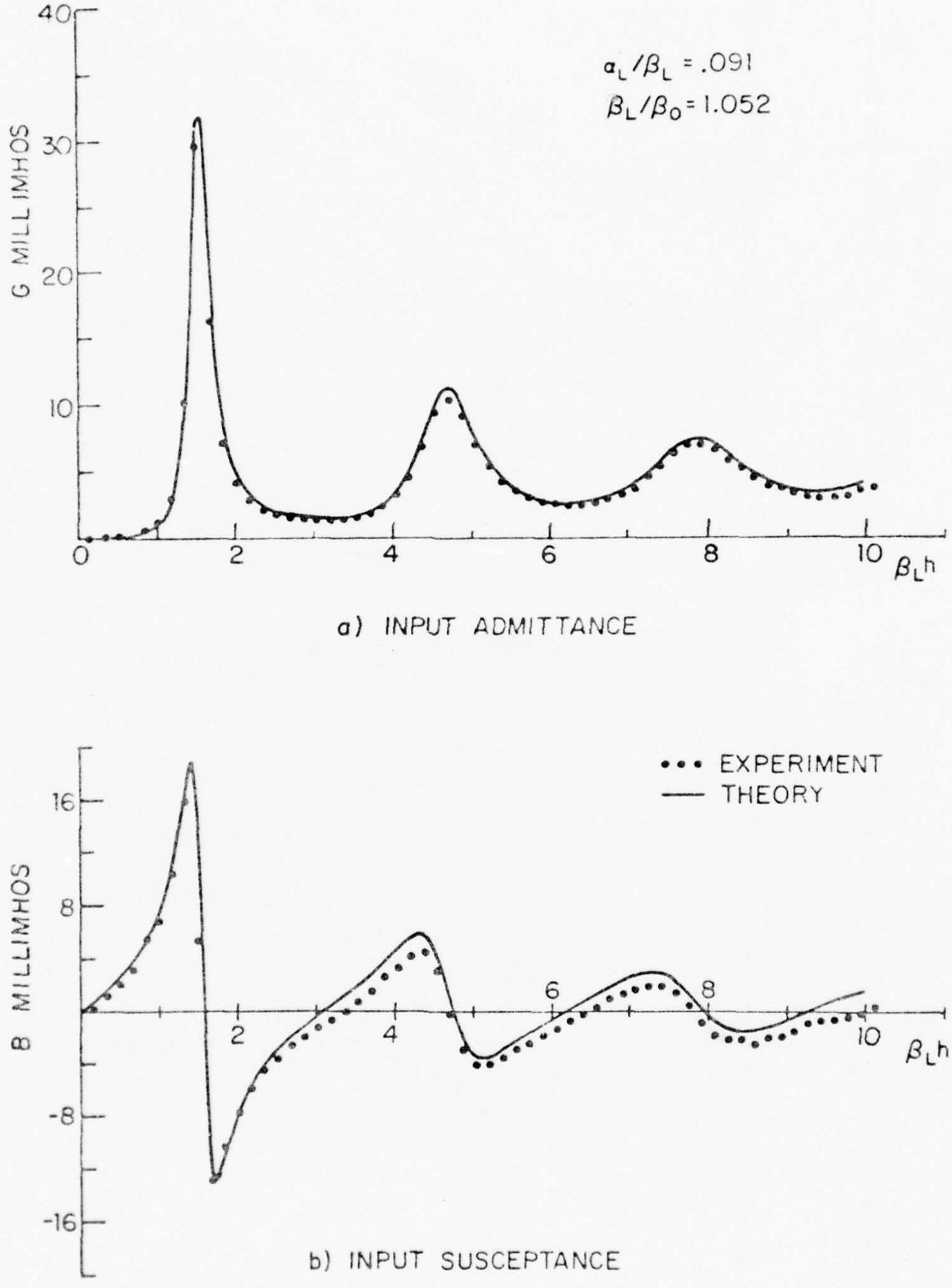


FIG. 3.21 INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$

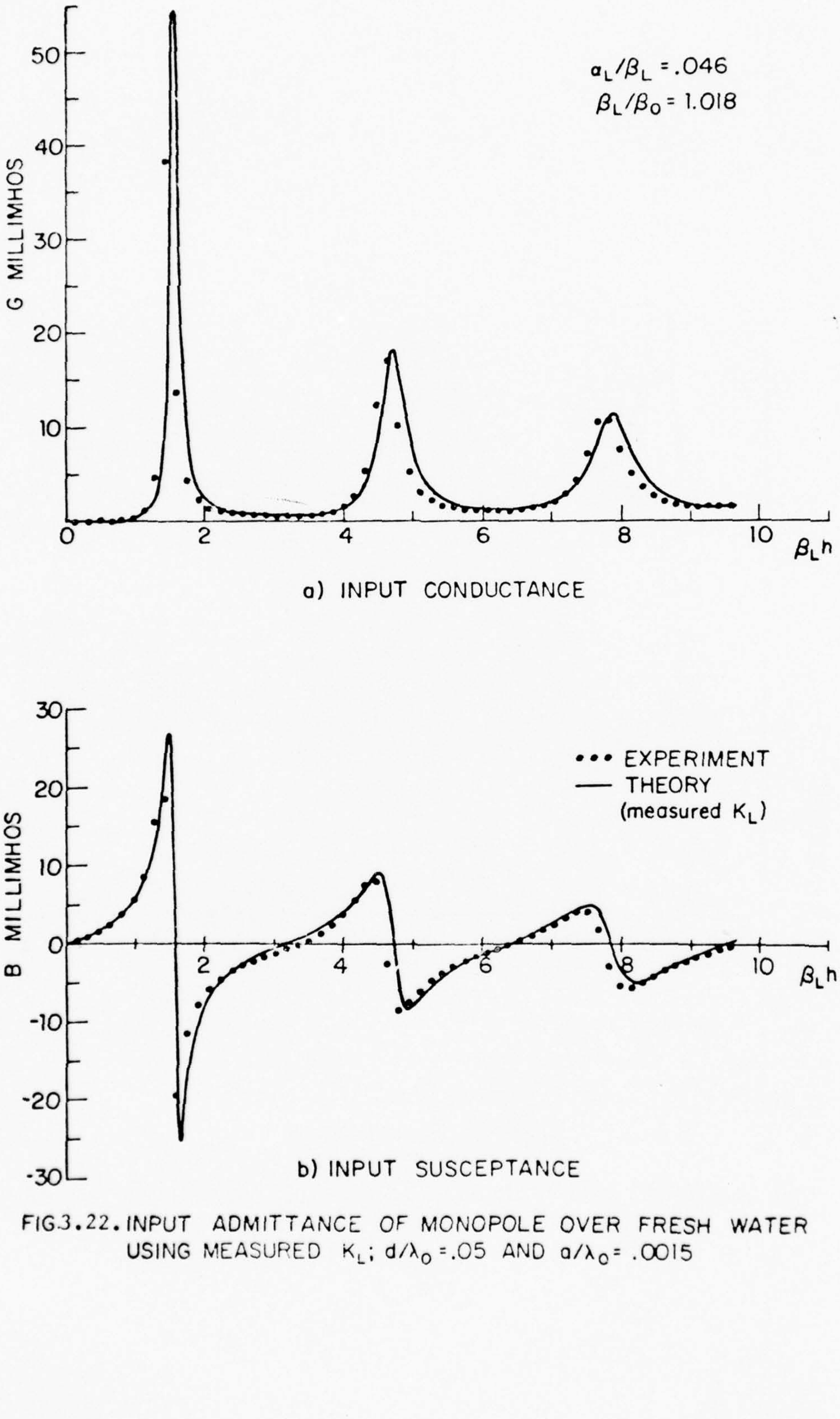


FIG.3.22. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER USING MEASURED K_L; d/λ_0 =.05 AND a/λ_0 = .0015

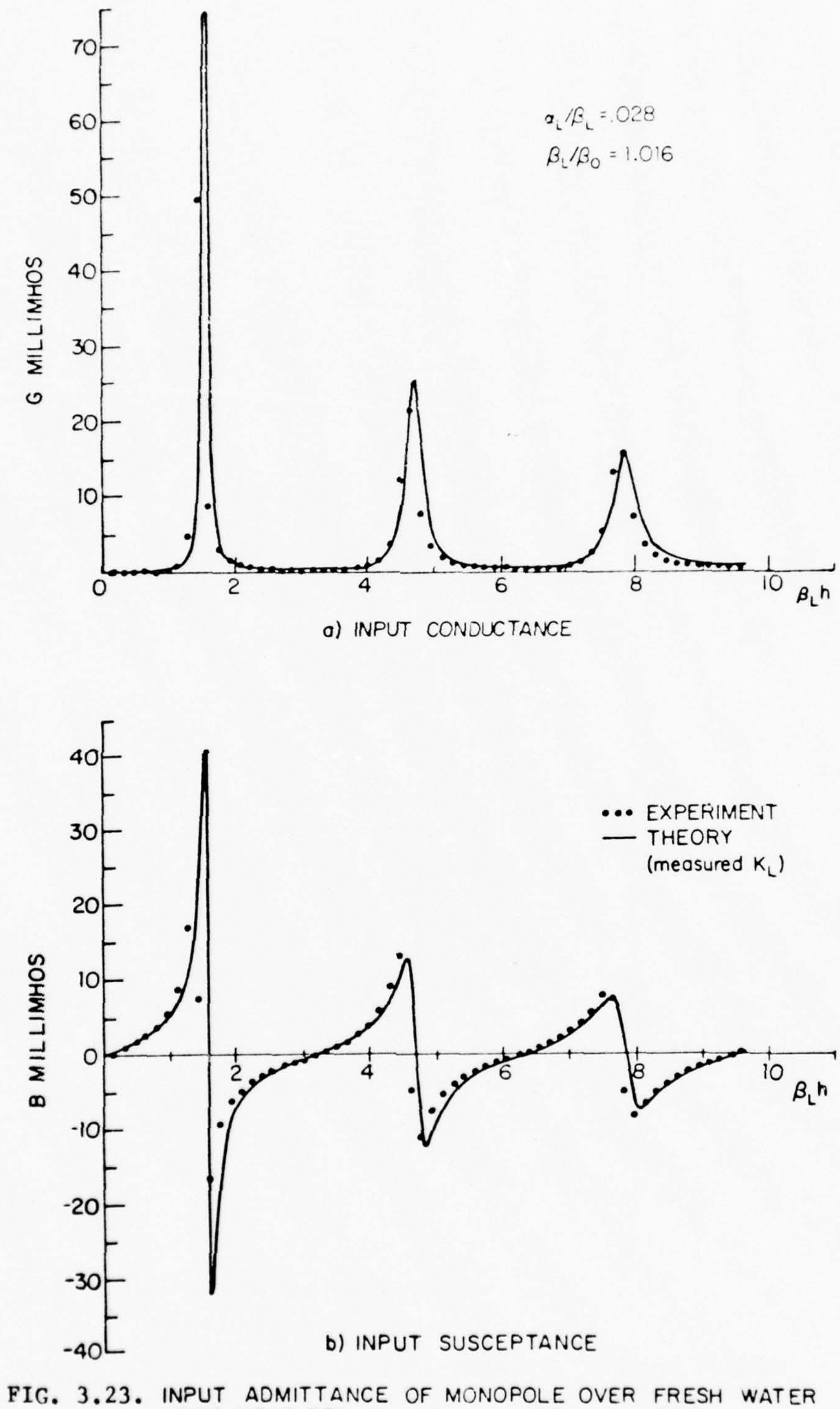


FIG. 3.23. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER USING MEASURED K_L; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$

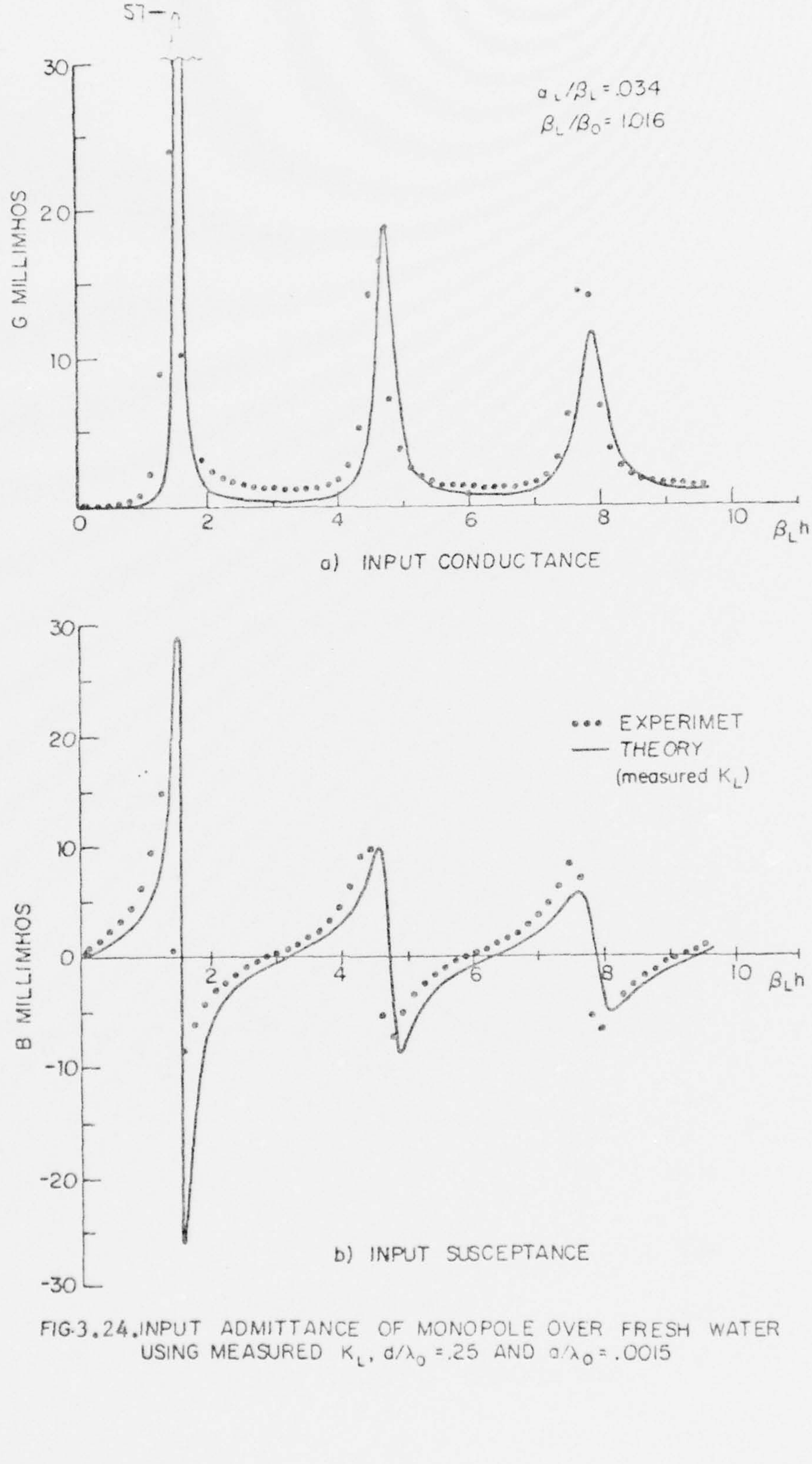


FIG.3.24. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER USING MEASURED K_L, $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$

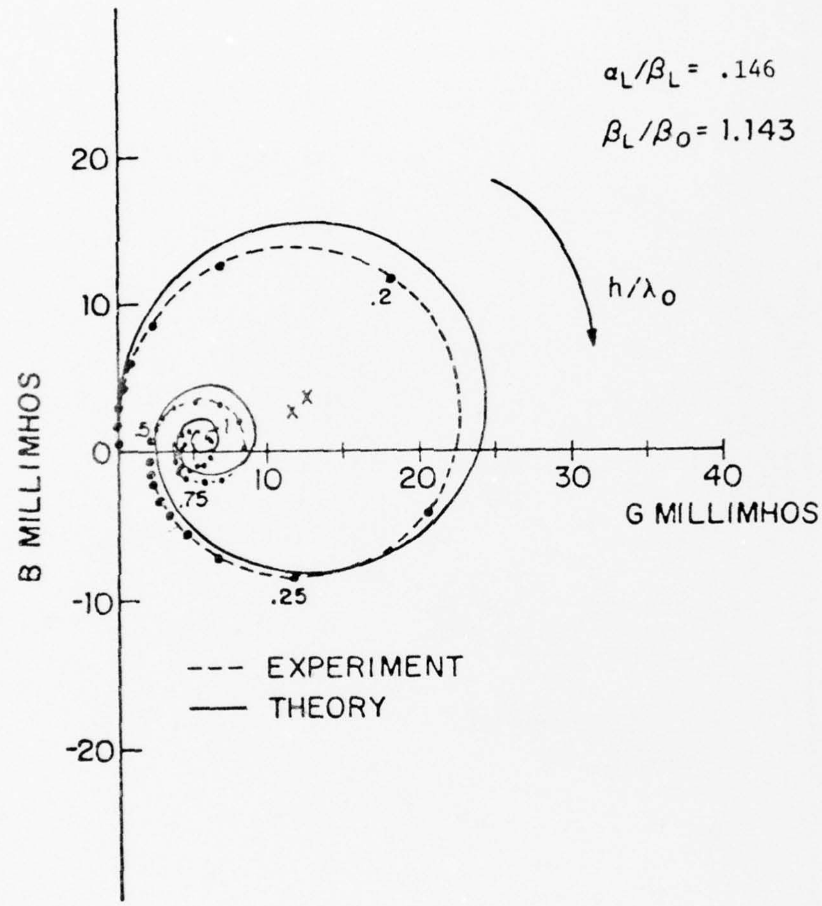


FIG. 3.25. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER; $d/\lambda_0 = .01$ AND $a/\lambda_0 = .0015$.

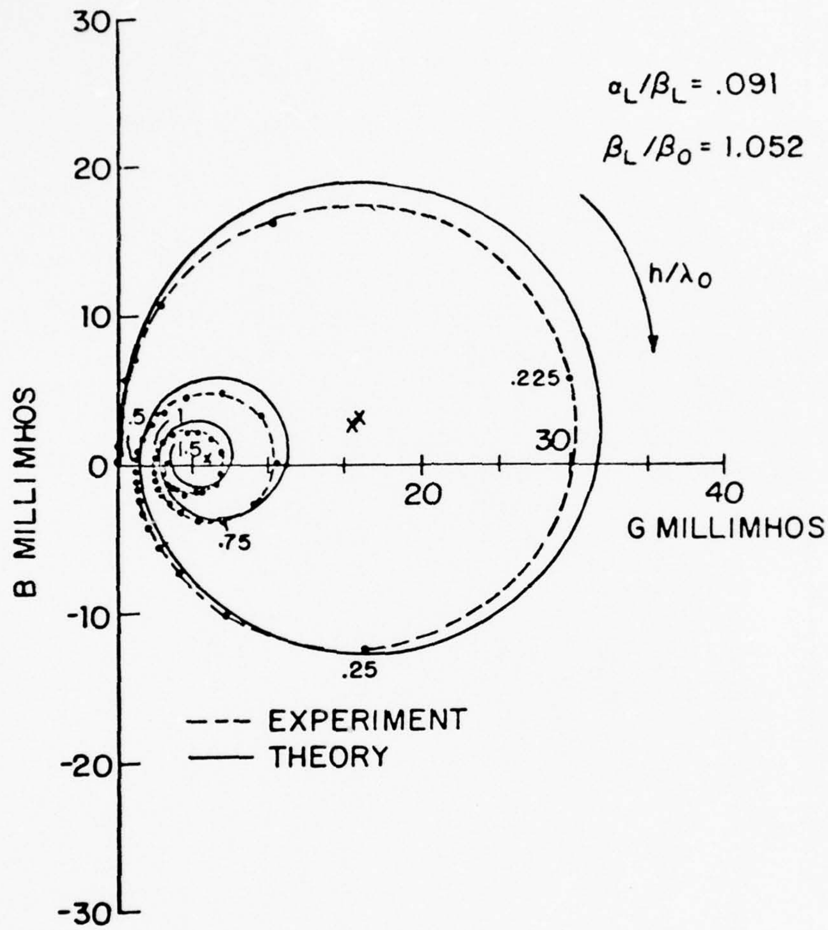


FIG.3.26. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

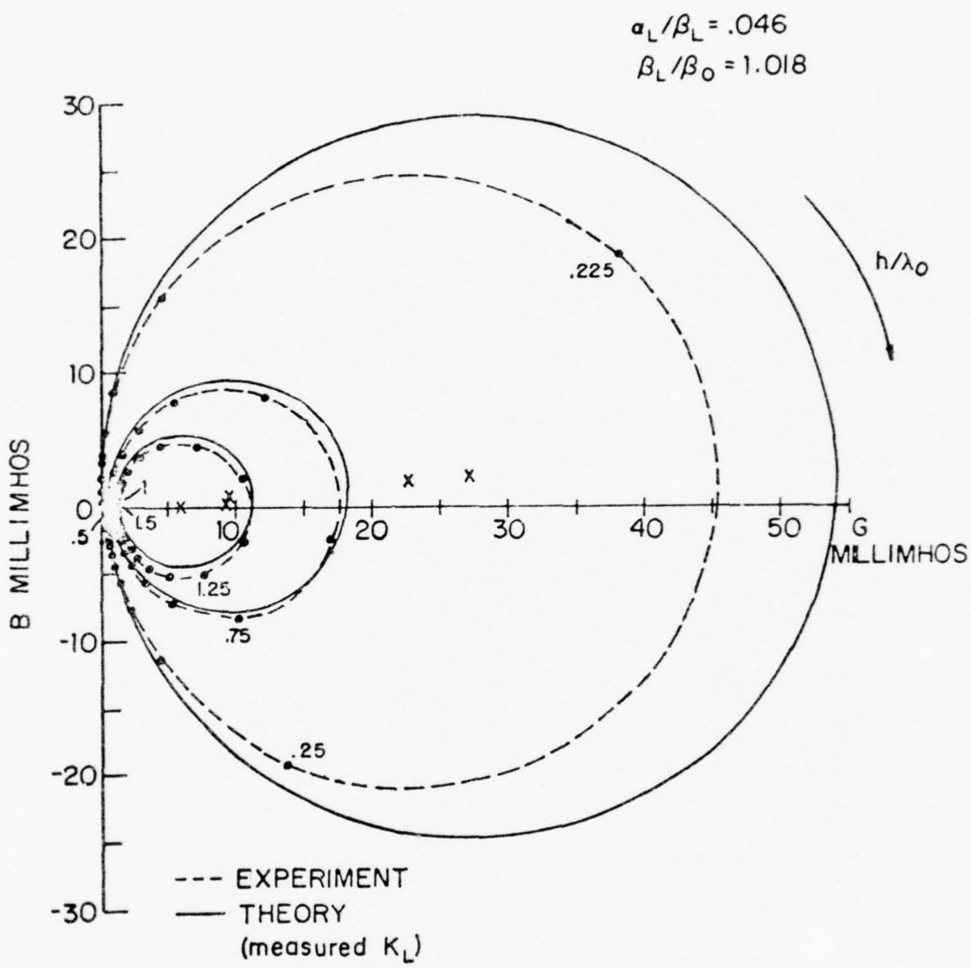


FIG. 3.27. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$

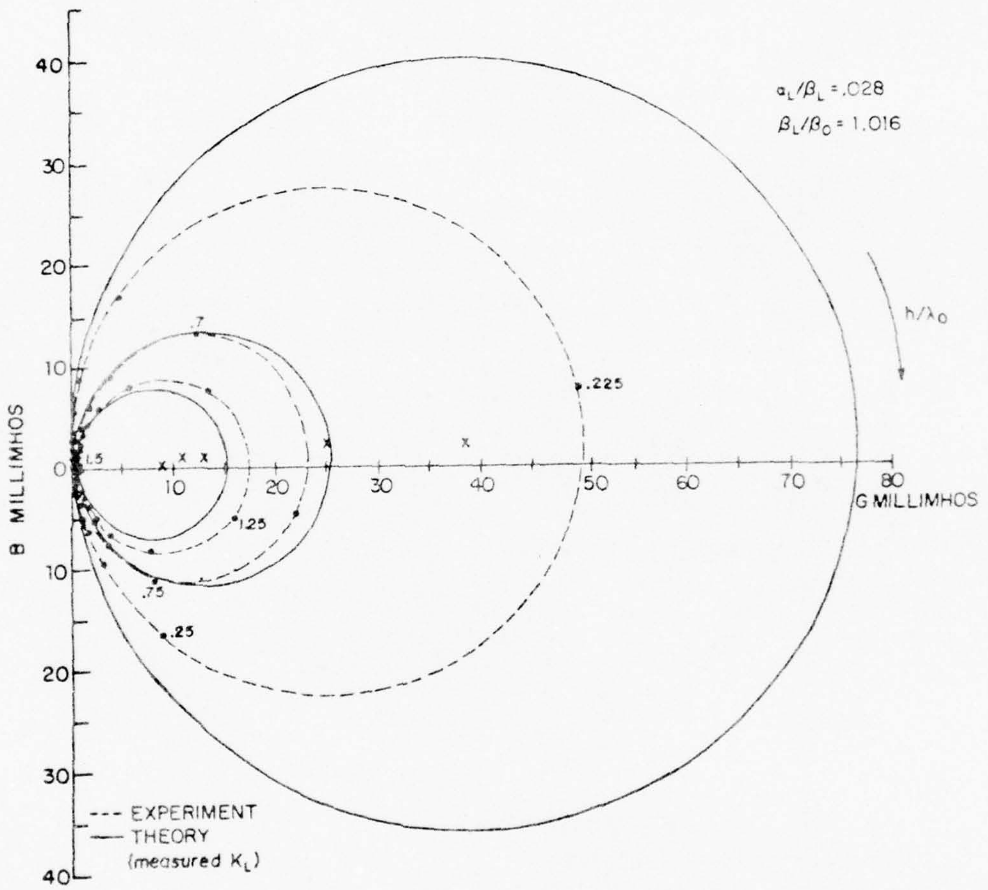


FIG. 3.28 INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER USING MEASURED K_L, d/λ_0 = .1 AND a/λ_0 = .0015

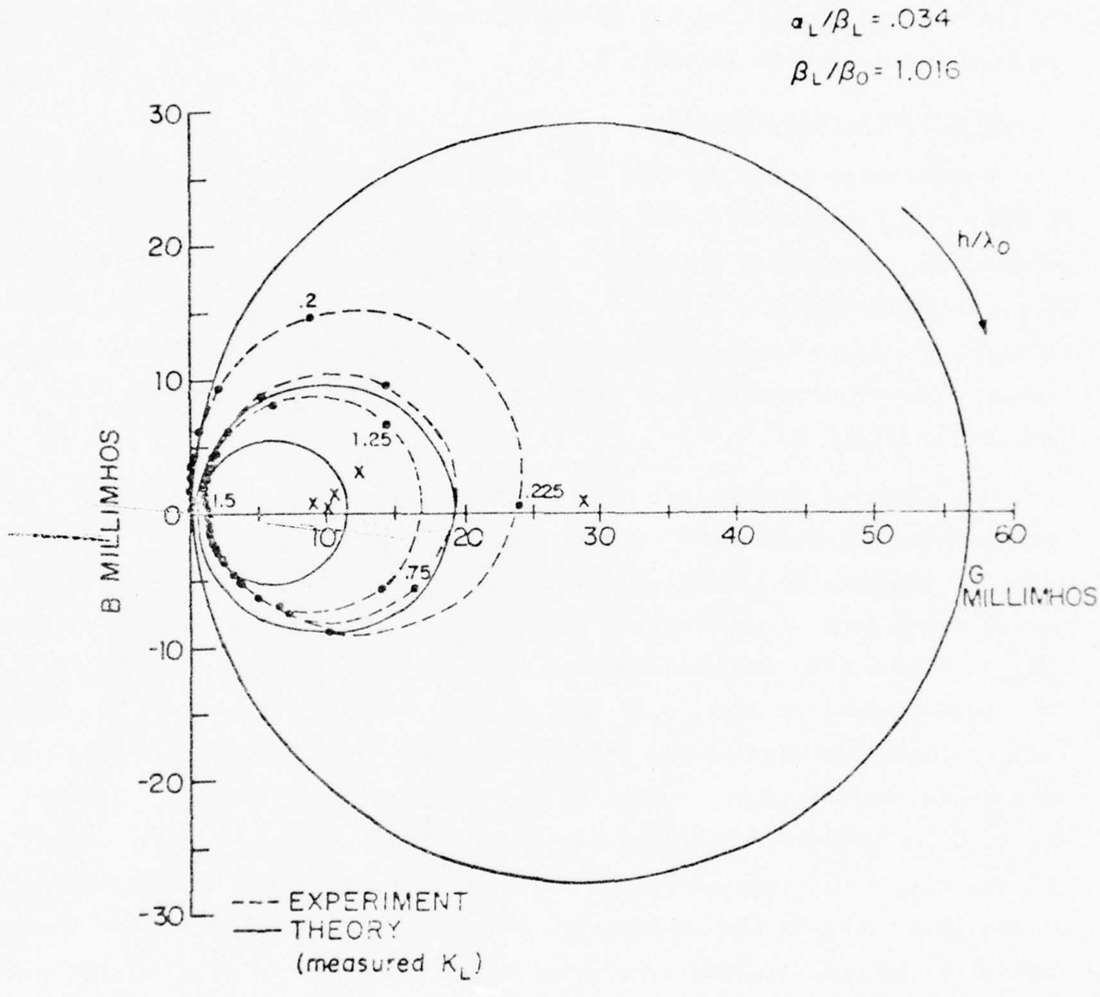


FIG. 3.29 INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER USING MEASURED K_L, d/λ_0 = .25 AND a/λ_0 = .0015

effective wave numbers. In the d/λ_0 = .05 and d/λ_0 = .1 cases, the agreement is good for a zeroth-order theory except in the region of the first resonance. At d/λ_0 = .25, where the validity of the transmission-line behavior becomes questionable, the agreement is not very good. This suggests that at this height the departure from the simple zeroth-order theory for the current and admittance may be significant. Tabulation of the measured admittance is given in Appendix B.

Salt-Water Measurements

A salt-water solution with the electrical properties described by ε_r = 81 and σ = 3.9 mhos/m was used for this set of measurements. This solution corresponds to solution number 3 in Section 2.5. The electrical properties were initially measured at 19° C and then later rechecked at 22° C. No noticeable change in the conductivity or relative dielectric constant was observed. All measurements were made with the water temperature in the range from 19° C to 22° C.

The measured current and charge distributions for the salt-water case are presented in Figs. 3.30 through 3.46. Tables of the measured data are given in Appendix B. A set of conclusions similar to those for fresh water can be drawn from an examination of the data. For the two closest spacings, d/λ_0 = .01 and .02, the measurements agree quite well with King's theory. This is evidenced in Figs. 3.30 through 3.35. It is interesting to observe that at these two heights the line attenuation is significantly higher for an antenna over fresh water than it is for one over salt water. Figs. 3.36 and 3.40 compare King's theory with the experimental measurements for d/λ_0 = .05 and d/λ_0 = .1, respectively. For both of these cases, variations greater than 20% arise in the attenuation constant. A comparison of the measured data with the semi-empirical solution using the measured value of the effective wave number k_L is presented in Figs. 3.37 through 3.39 and Figs. 3.41 through 3.43. As in the fresh-water case, it is evident that the sinusoidal form for the current and charge still holds and that the agreement is quite good when the measured effective wave number is used. For d/λ_0 = .25, shown in Figs. 3.44 through 3.46, the departure from sinusoidal theory becomes more evident with the greatest variation appearing at the driving point. For an approximate representation of the current and charge distributions, the semi-empirical solution may be quite acceptable.

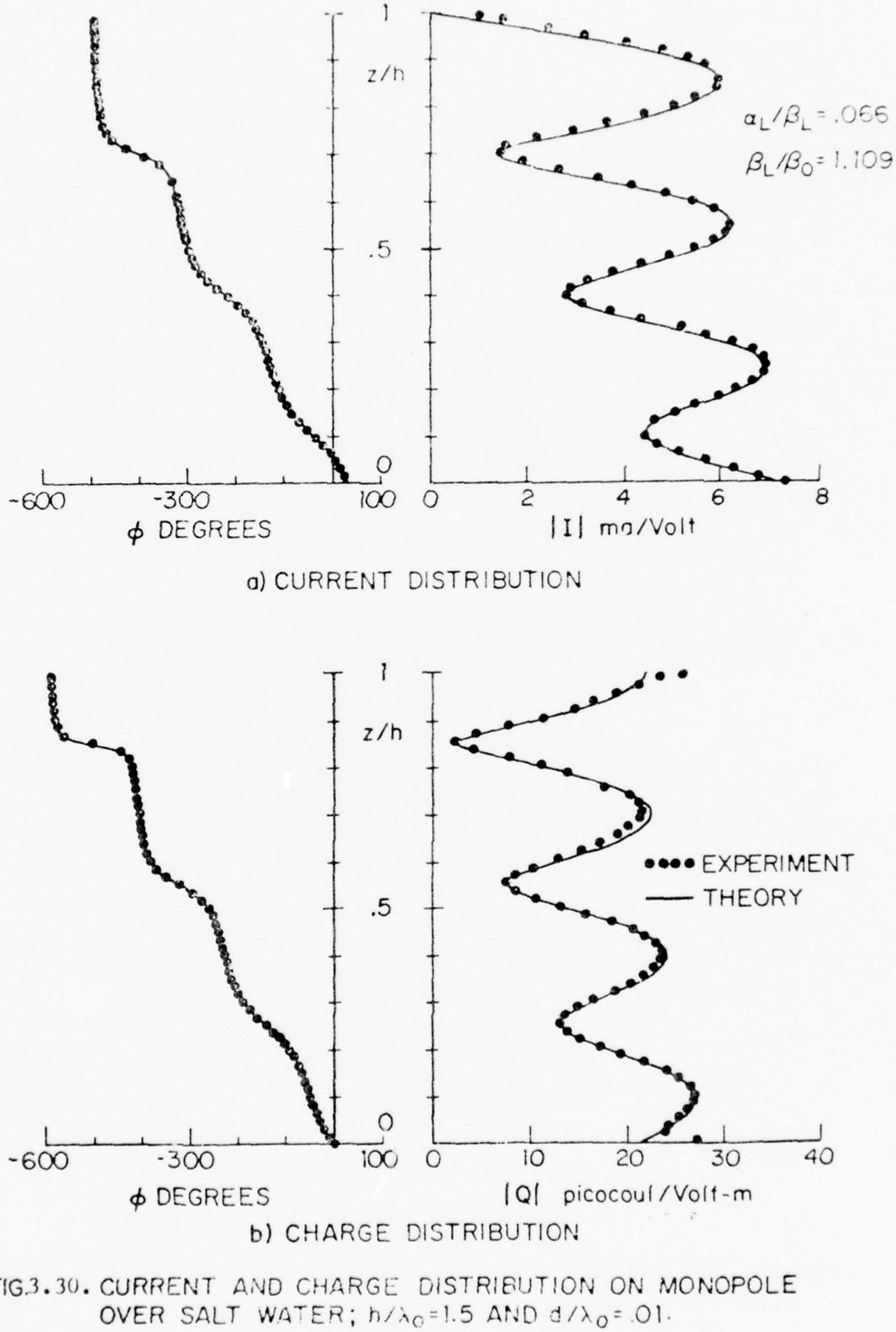


FIG.3.30. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$.

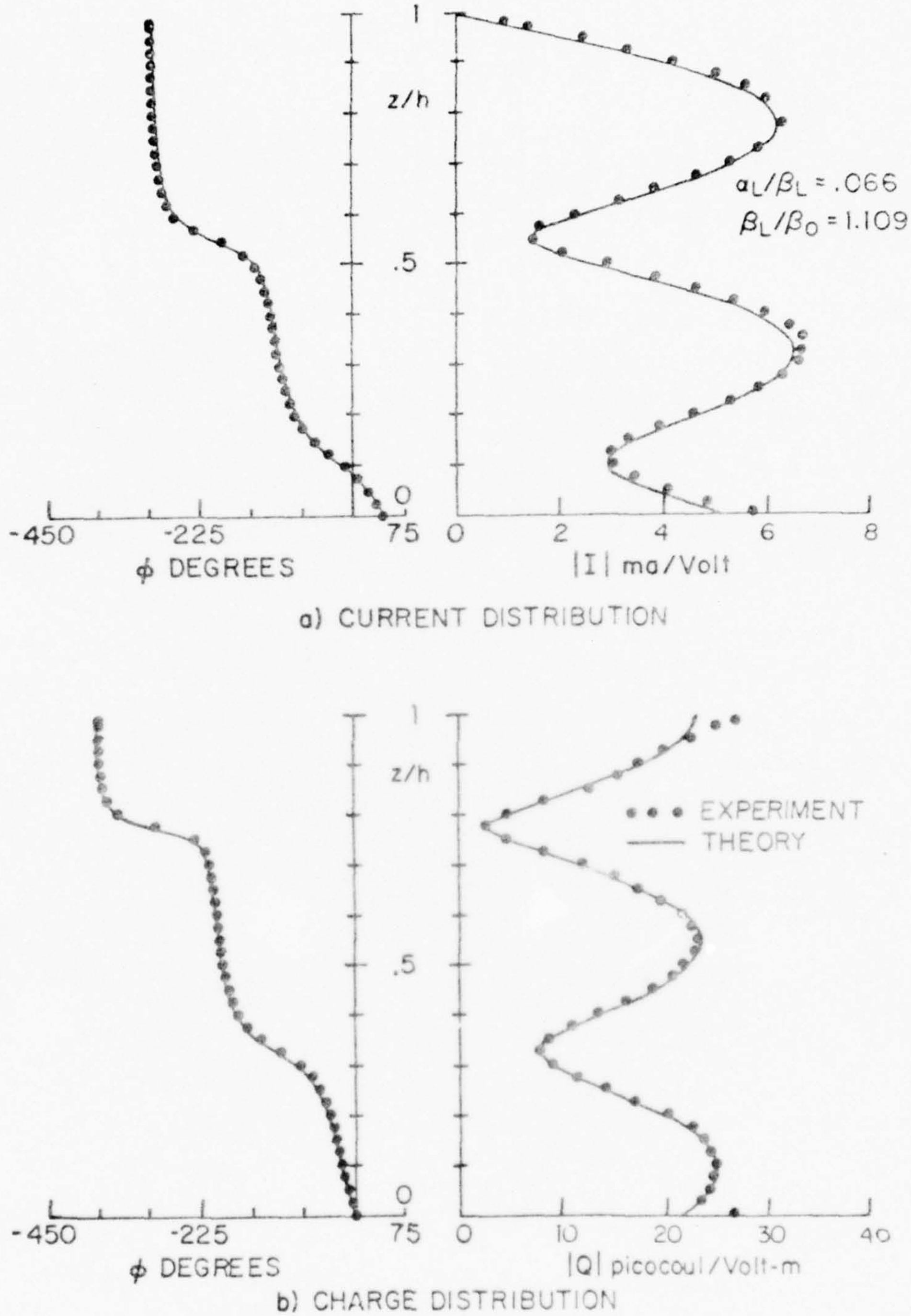


FIG.3.31. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

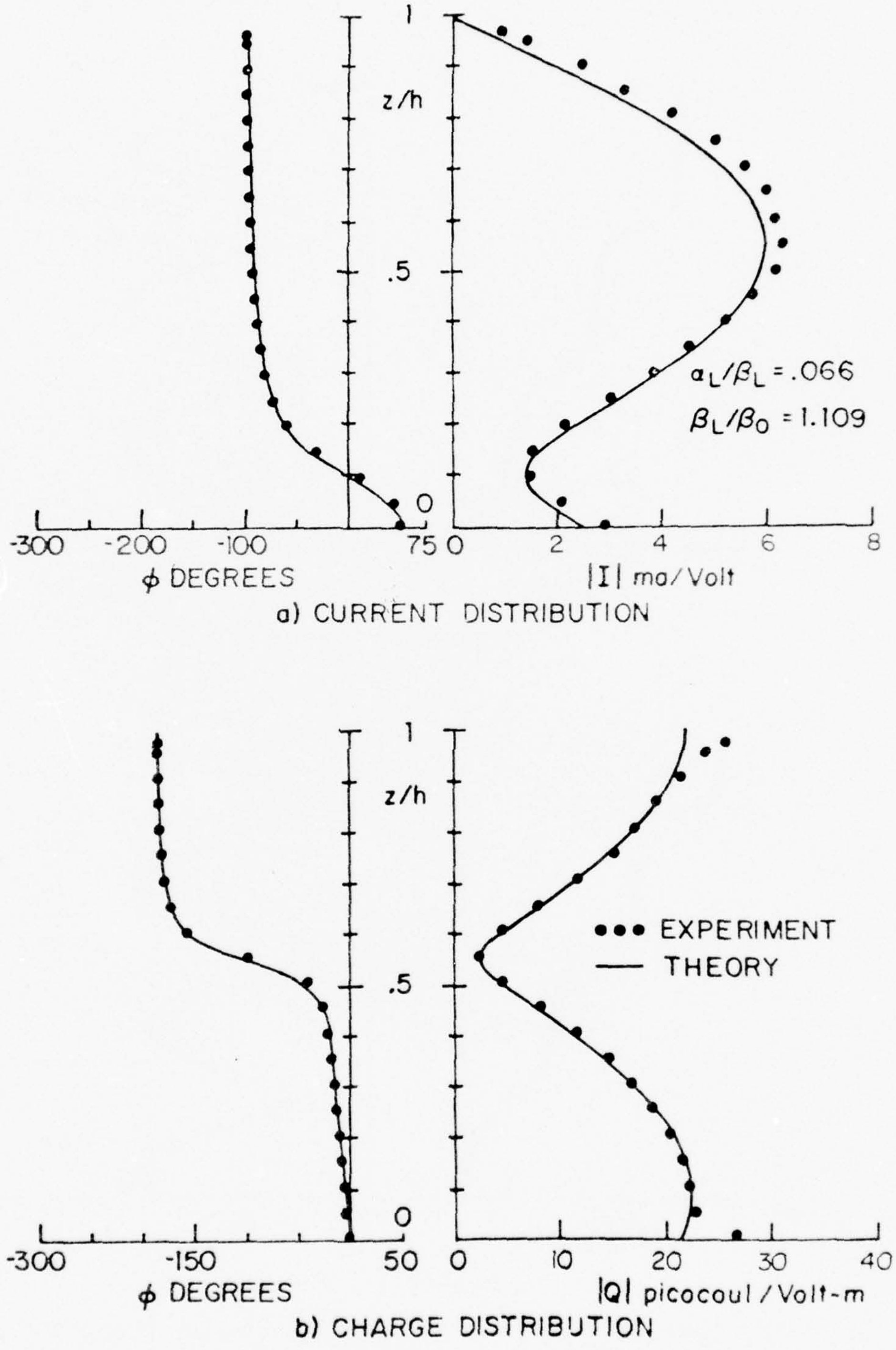


FIG.3.32. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .01$.

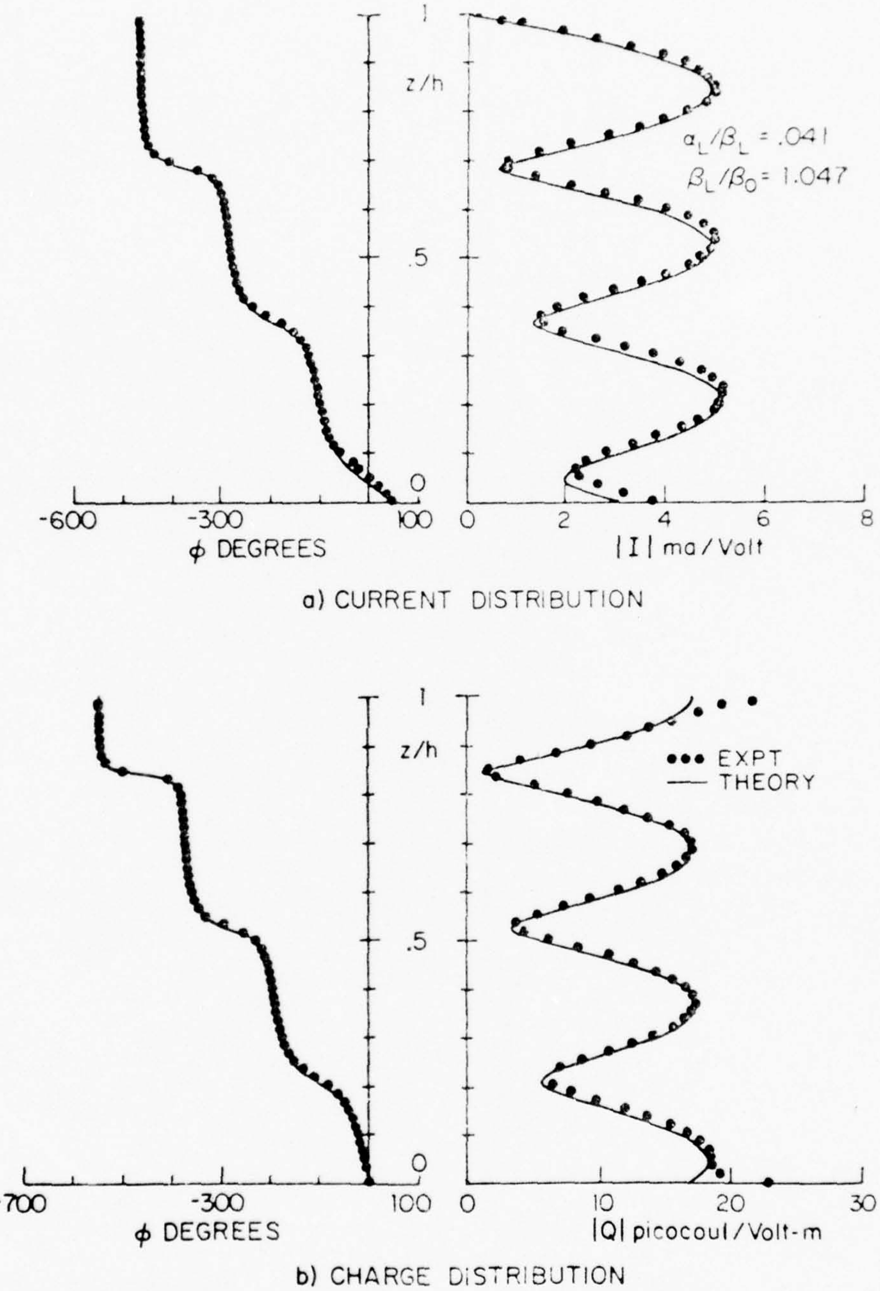


FIG. 3.33. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

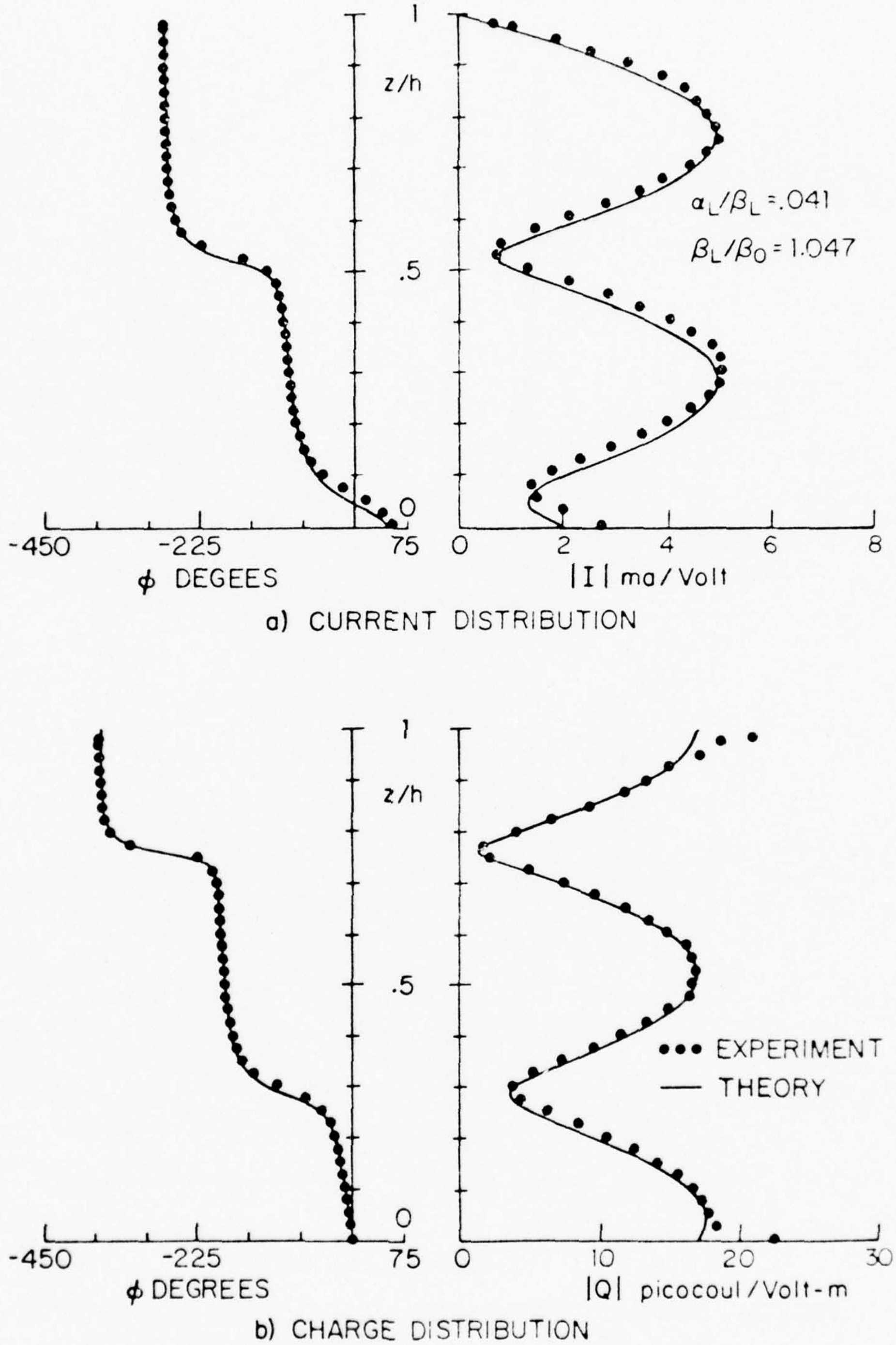


FIG. 3.34. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .02$

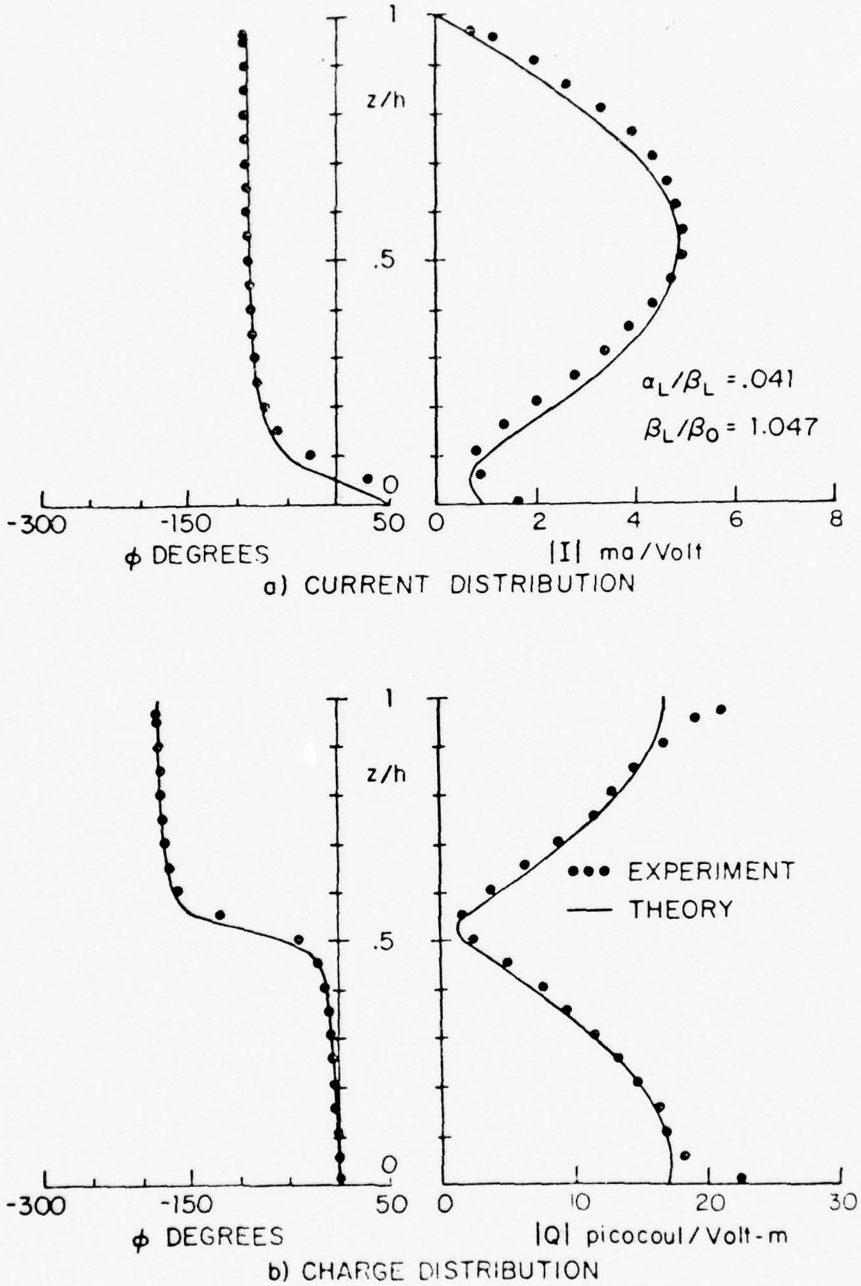


FIG.3.35. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; h/λ_0 = .5 AND d/λ_0 = .02.

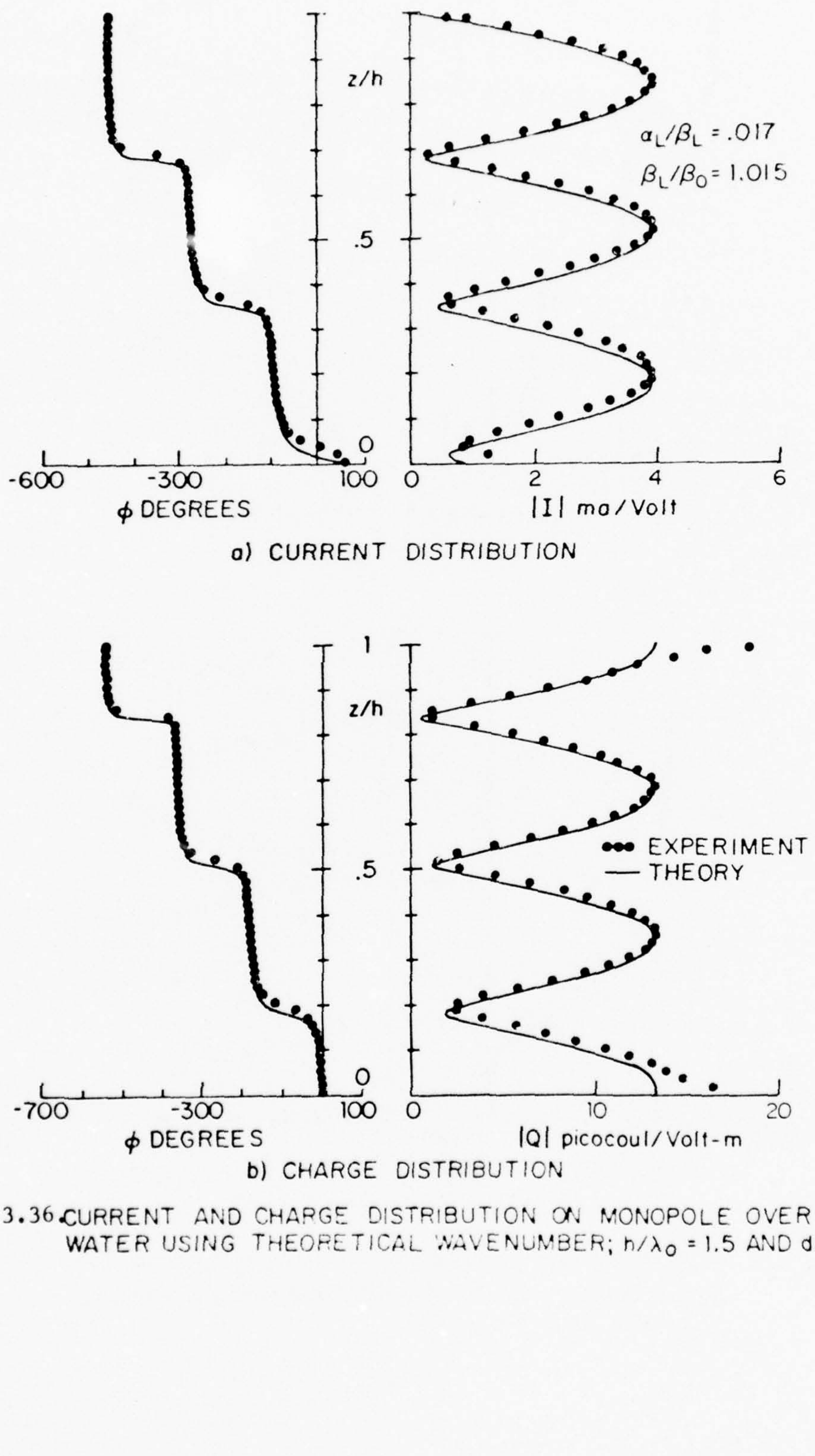


FIG.3.36. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING THEORETICAL WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$

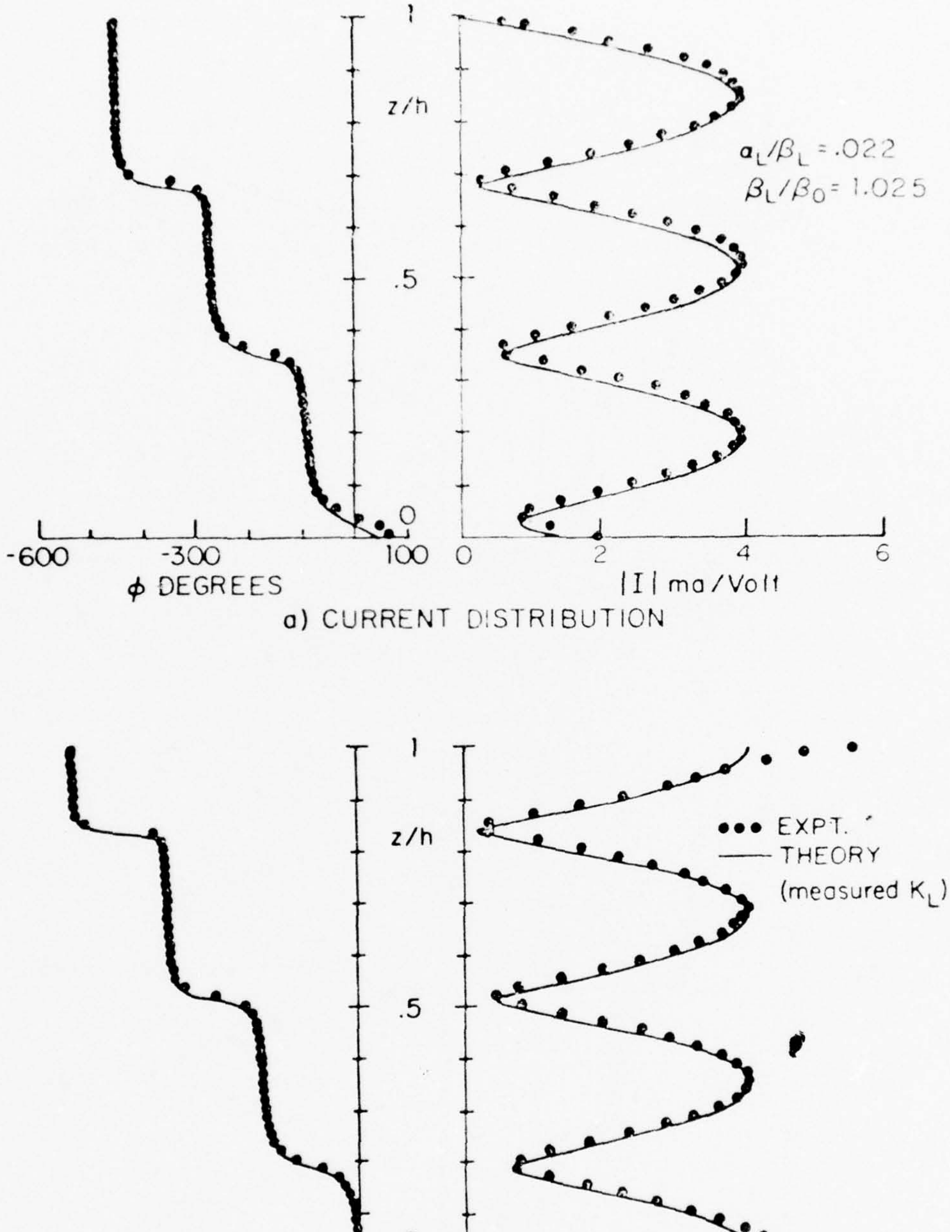


FIG. 3.37. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$

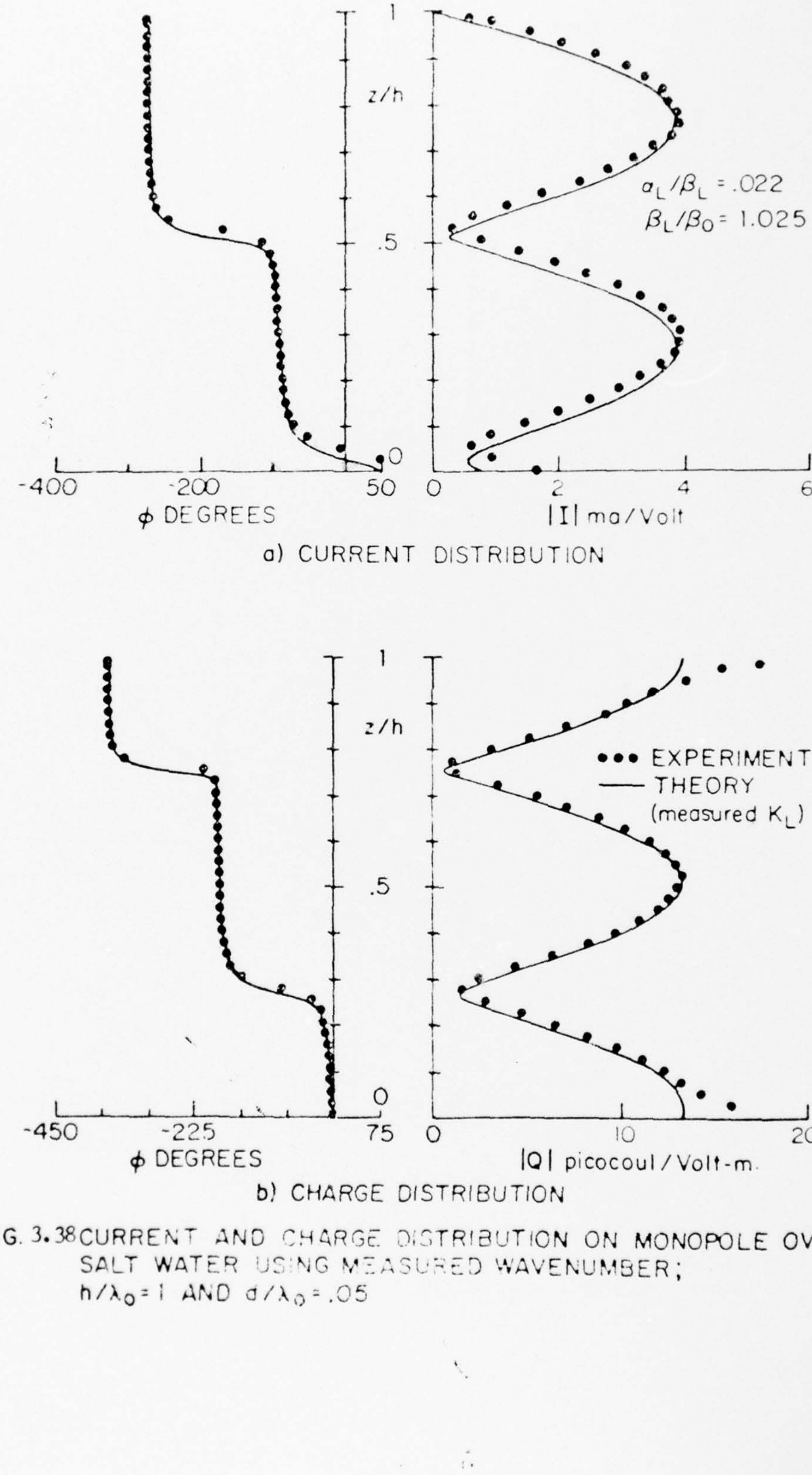


FIG. 3.38 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .05$

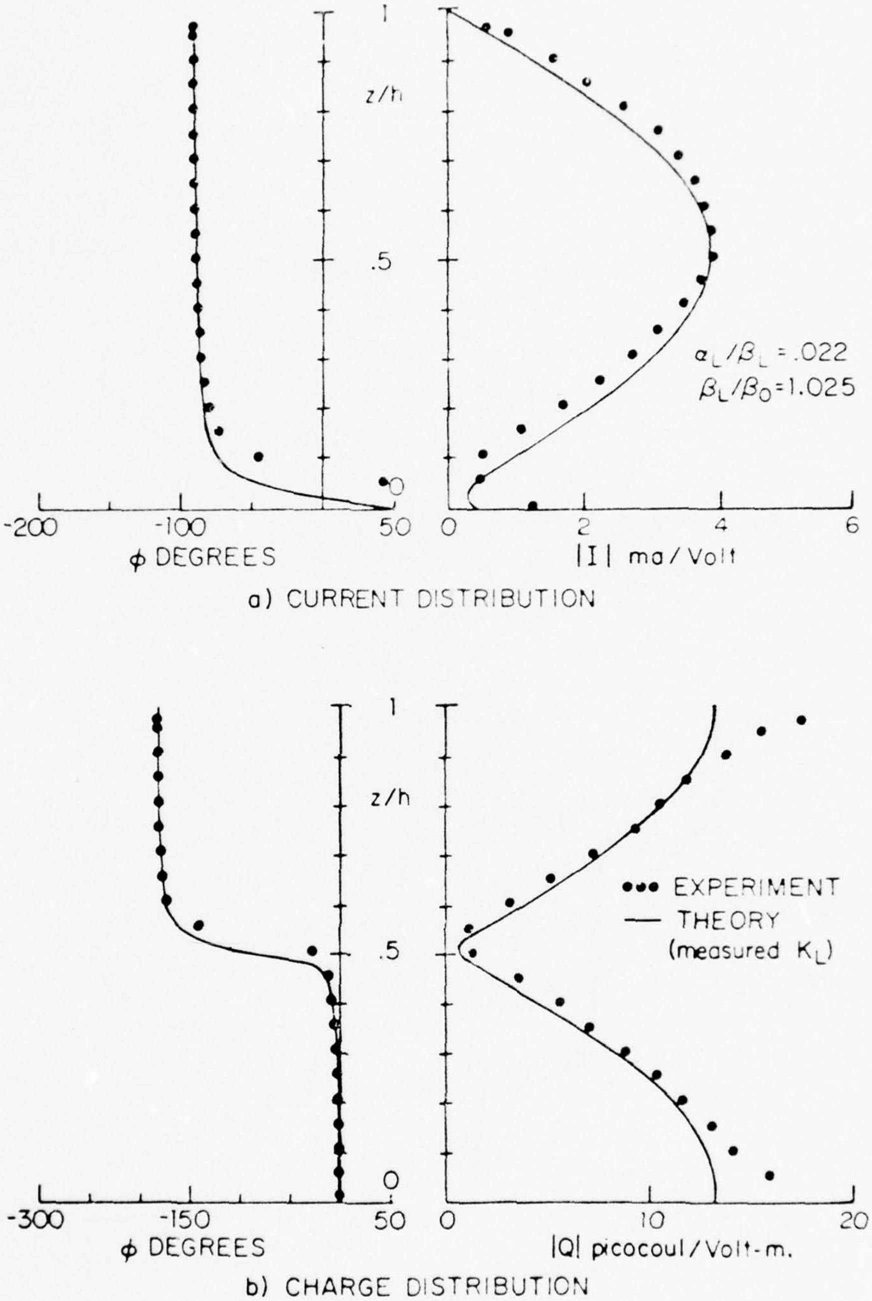


FIG.3.39. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; h/λ_0=.5 AND d/λ_0=.05.

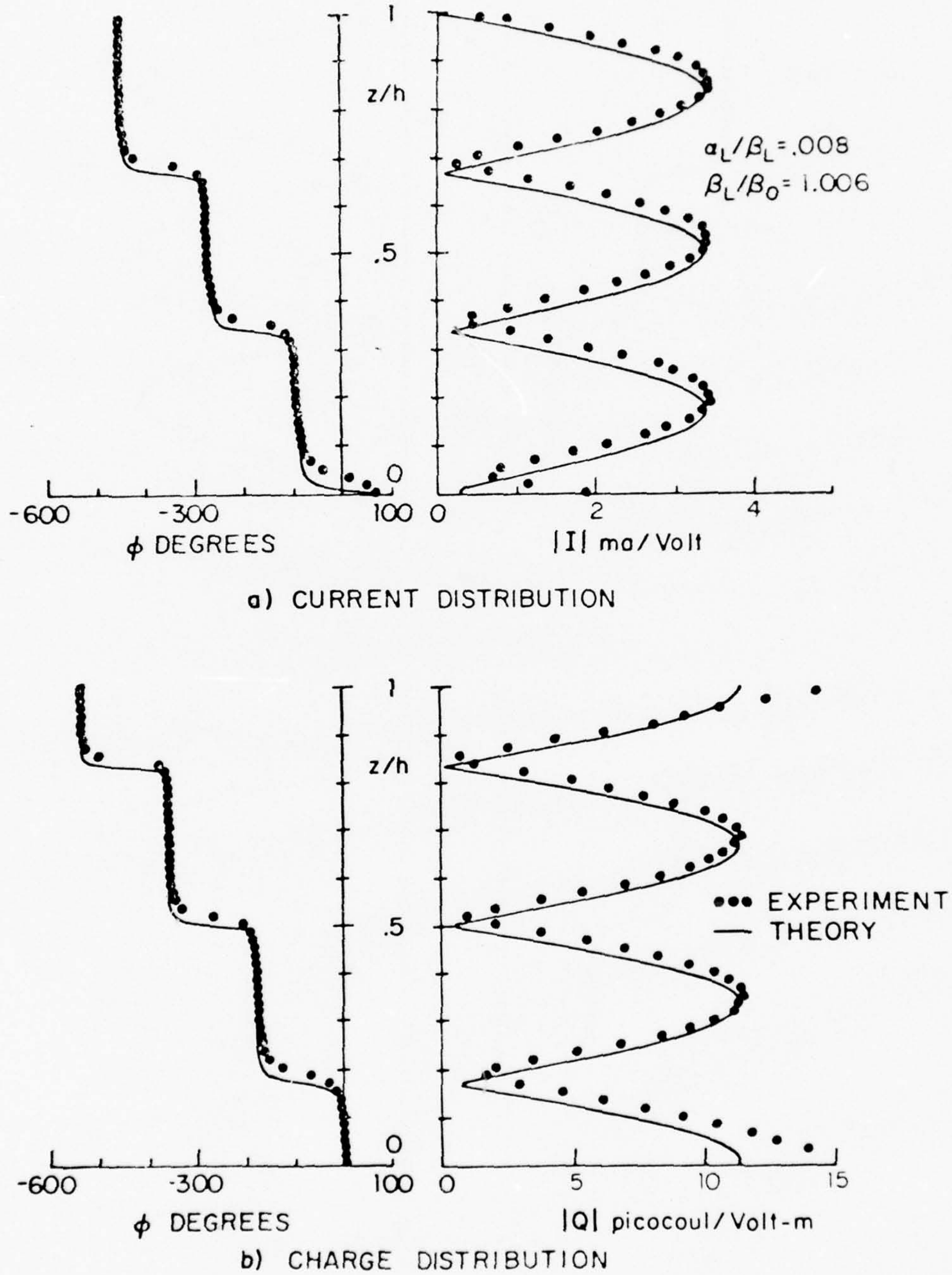


FIG. 3.40. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING THEORETICAL WAVENUMBER; h/λ_0 = 1.5 AND d/λ_0 = .1.

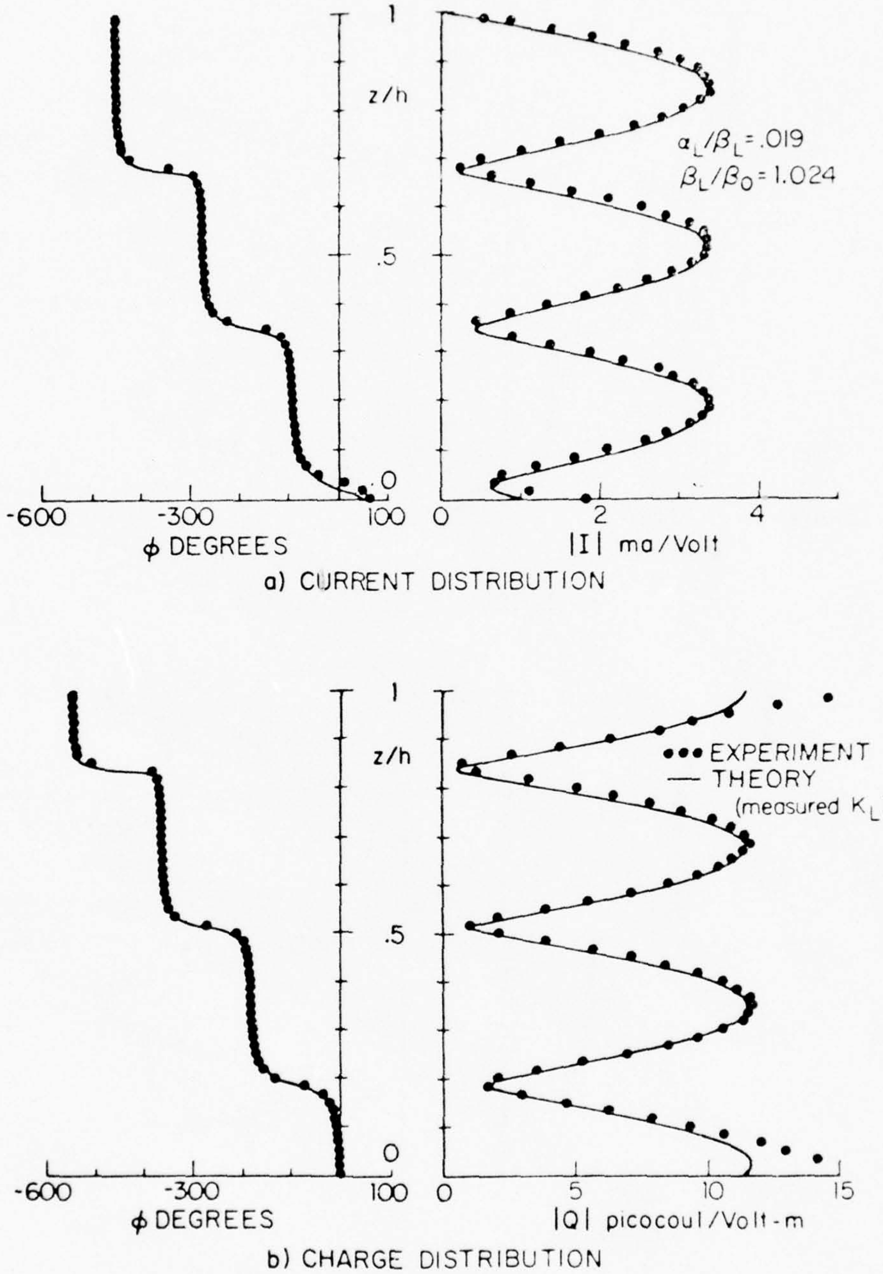
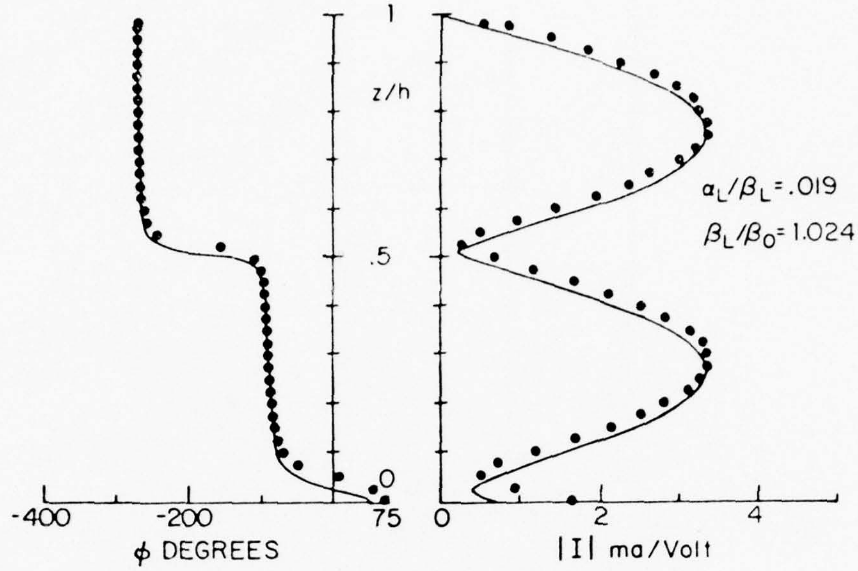
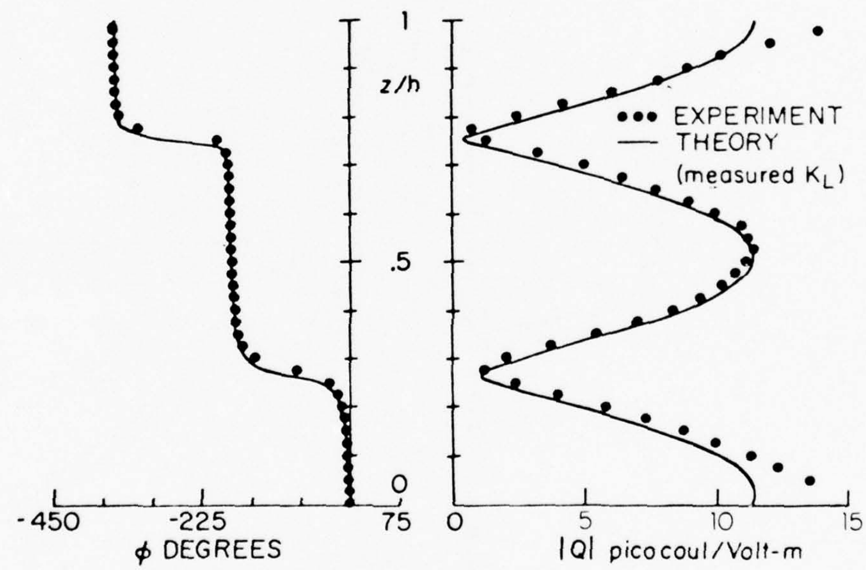


FIG.3.41. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.42. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

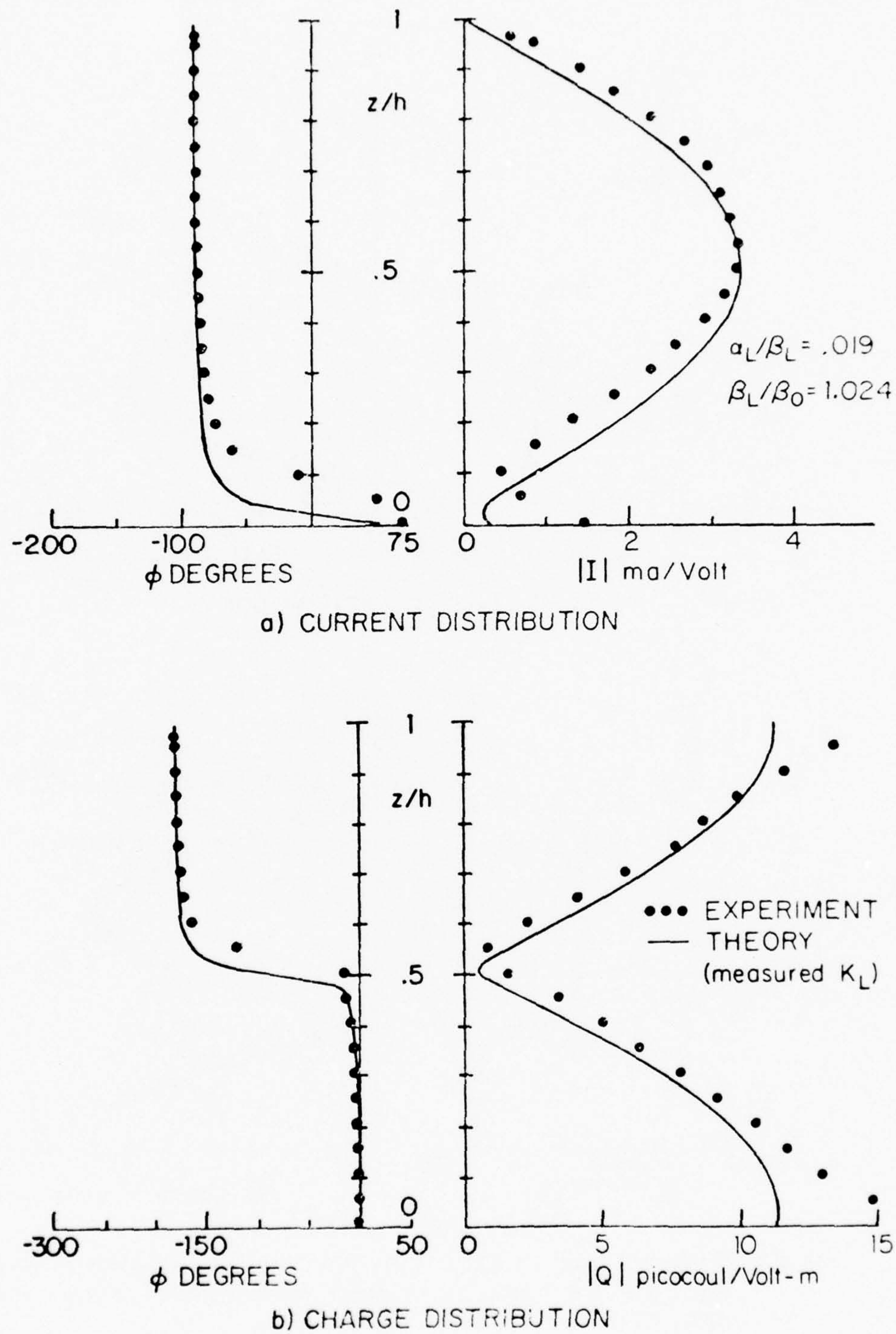


FIG.3.43. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; h/λ_0 = .5 AND d/λ_0 = .1.

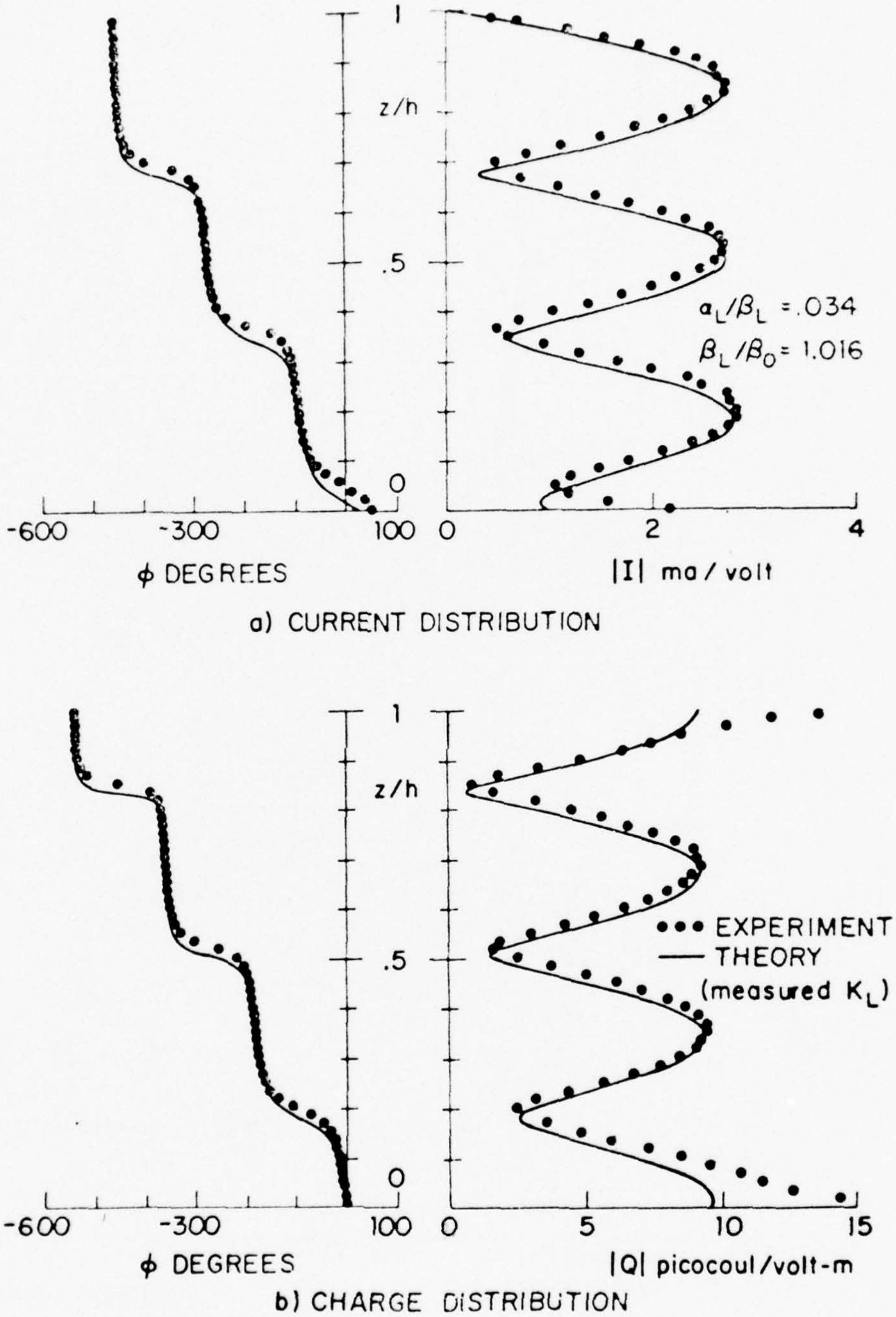


FIG. 3.44. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVE NUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .25$.

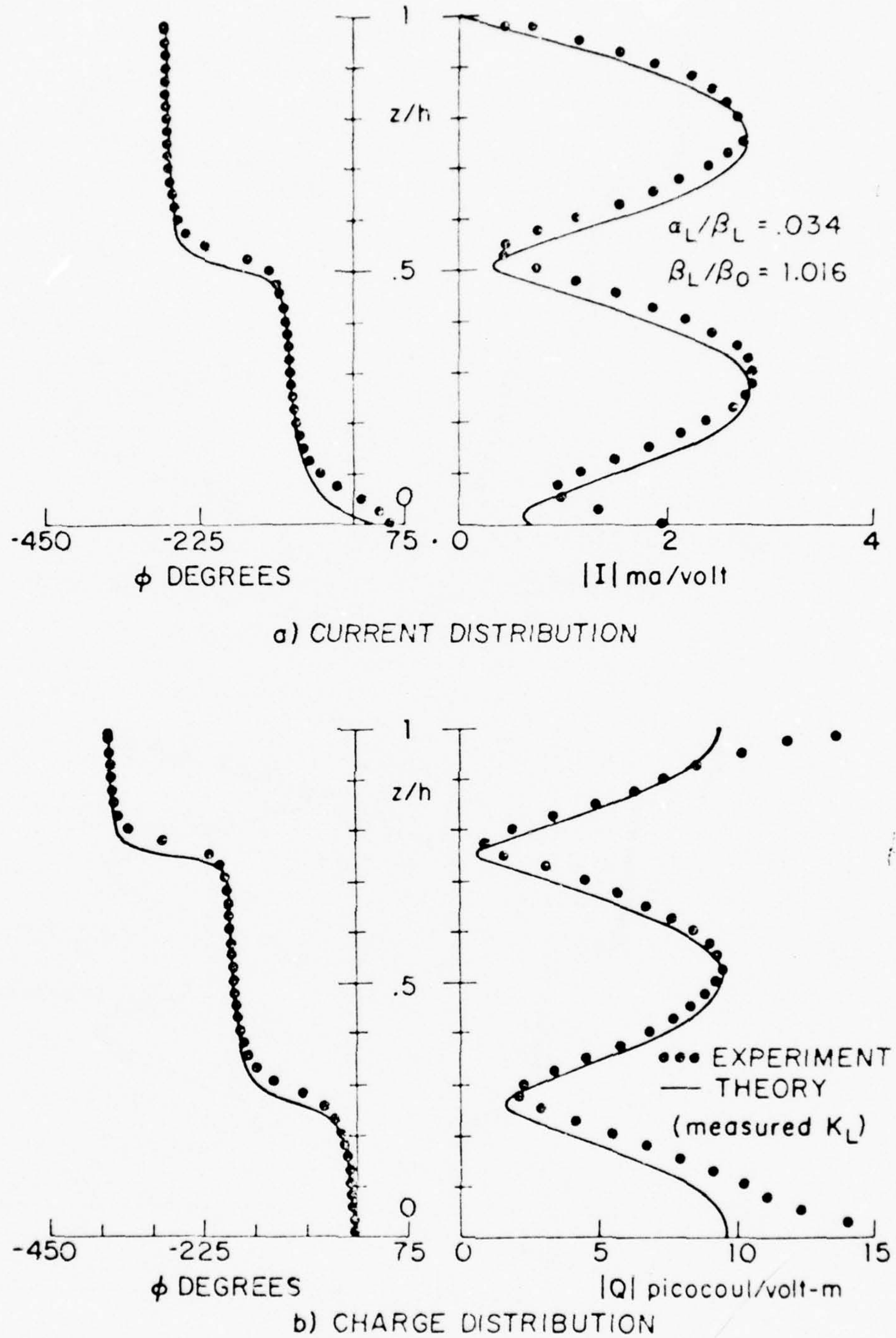


FIG. 3.45. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVE NUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.

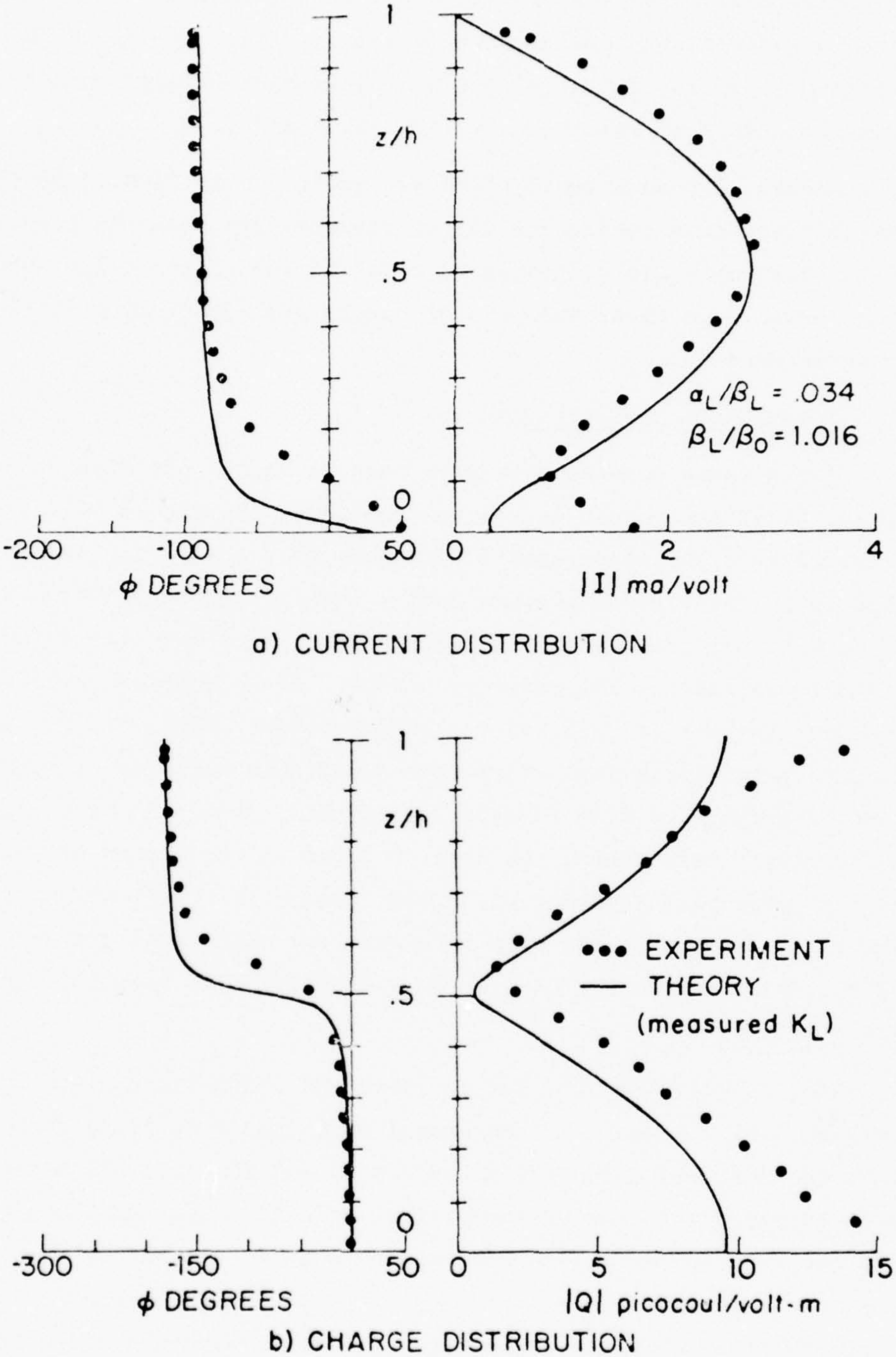


FIG. 3.46. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .25$.

Figure 3.47 compares the theoretical wave numbers on the wire with the measured values obtained from the previous data. At d/λ_0 = .01 and .02, the error in α_L/β_L is within 10% but this variation becomes much larger for greater heights as evidenced by Figs. 3.36 and 3.40.

Rectangular admittance plots are presented in Figs. 3.48 through 3.52; the corresponding admittance circle diagrams are shown in Figs. 3.53 through 3.57. Both sets are displayed in order of increasing d/λ_0. The conclusions to be drawn from these two sets of curves are identical to those for the fresh-water case.

Moist-Earth Measurements

Since these measurements were made on an outdoor ground plane, the external conditions could not be controlled as completely as in the two previous cases. The measurements were made over a nine-day period in early December. The air temperature during this period ranged from 35° F to 40° F ($\approx$ 2° - 5° C). The earth was a rich moist loamy material which was determined to consist of 20% water by weight. The electrical properties were determined to be ε_r = 11.5 and σ = .0022 mhos/m. Measurements made on earth samples taken three days apart gave comparable results. To prevent the earth's properties from changing drastically over the period during which measurements were taken, the area in front of the ground plane was covered with a large plastic sheet which was covered, in turn, with a pile of leaves. The sheet prevented rain from affecting the electrical properties of the earth, while the leaves were used as insulation to keep the earth from freezing at night.

The measured results for currents and charges are given in Figs. 3.58 through 3.69. Since the theoretical α_L values were found to be much larger than the measured effective α_L values at all heights, all measurements have been compared with the semi-empirical solution which utilizes measured effective wave numbers. The discrepancies in α_L are mainly due to the fact that the restriction, $|k_2| >> |k_1|$, imposed in King's theory is no longer strictly true for moist earth with ε_r = 11.5, although end effects may also play a factor in these discrepancies. Hence, at none of the heights was there acceptable agreement between King's theory and the experimental results. For d/λ_0 = .02, .05, and .1, the sinusoidal nature of the current and charge is obvious and, given the measured wave number, the agreement is

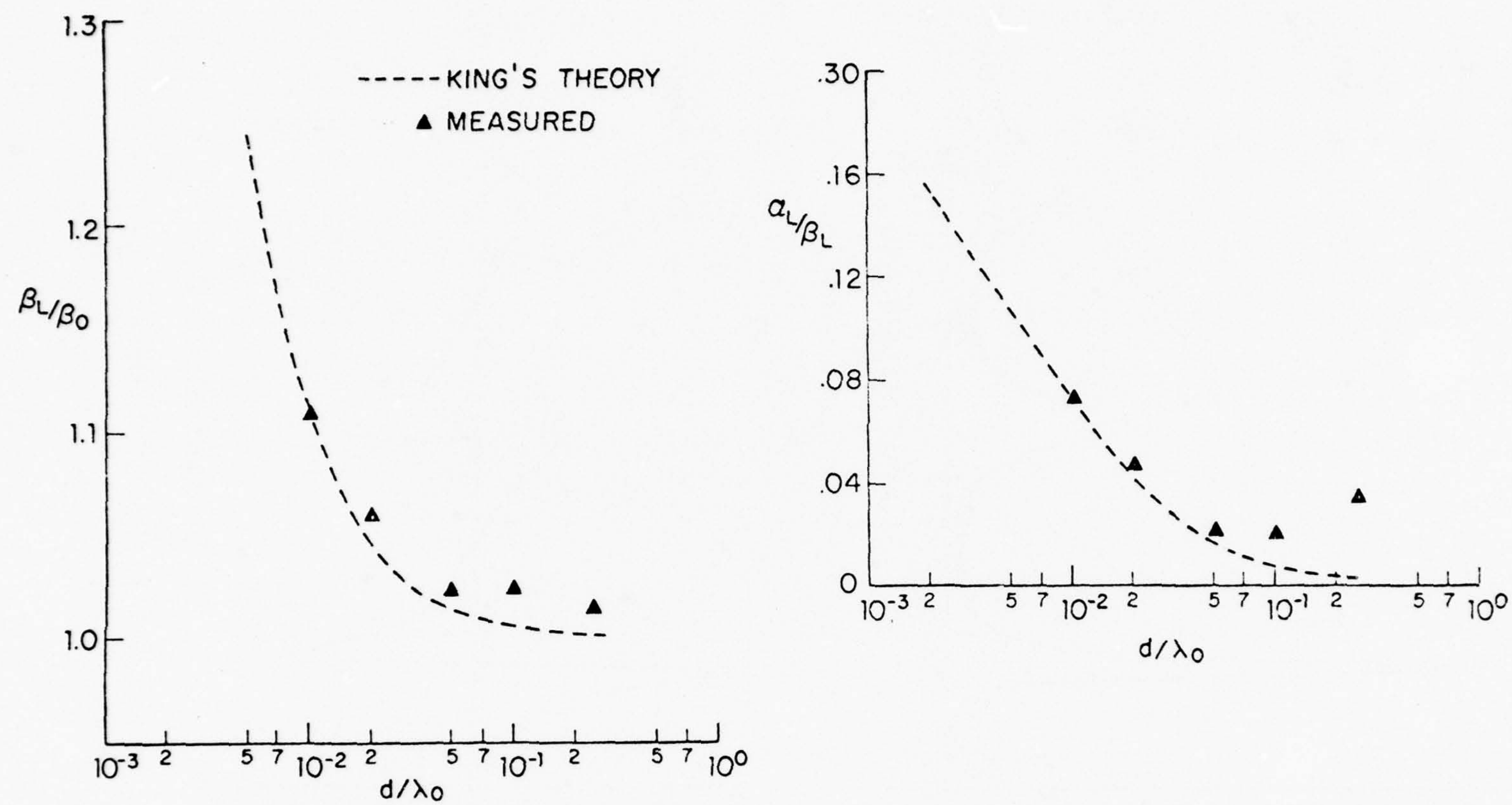


FIG. 3.47. WAVENUMBER ON HORIZONTAL WIRE OVER SALT WATER;
$\varepsilon_r = 81$ AND $P_e = 2.885$

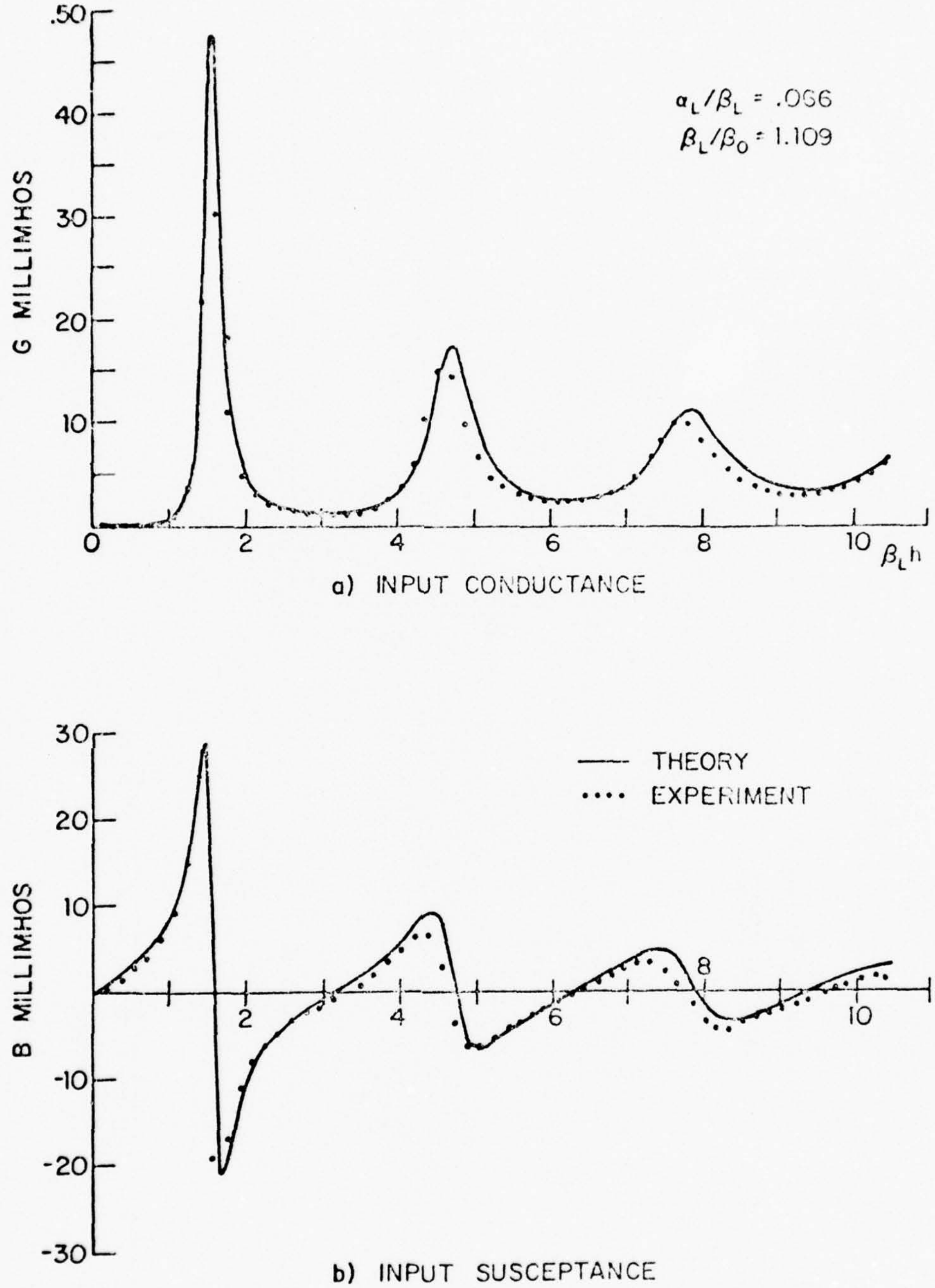


FIG. 3.48. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER; d/λ_0 = .01 AND a/λ_0 = .0015.

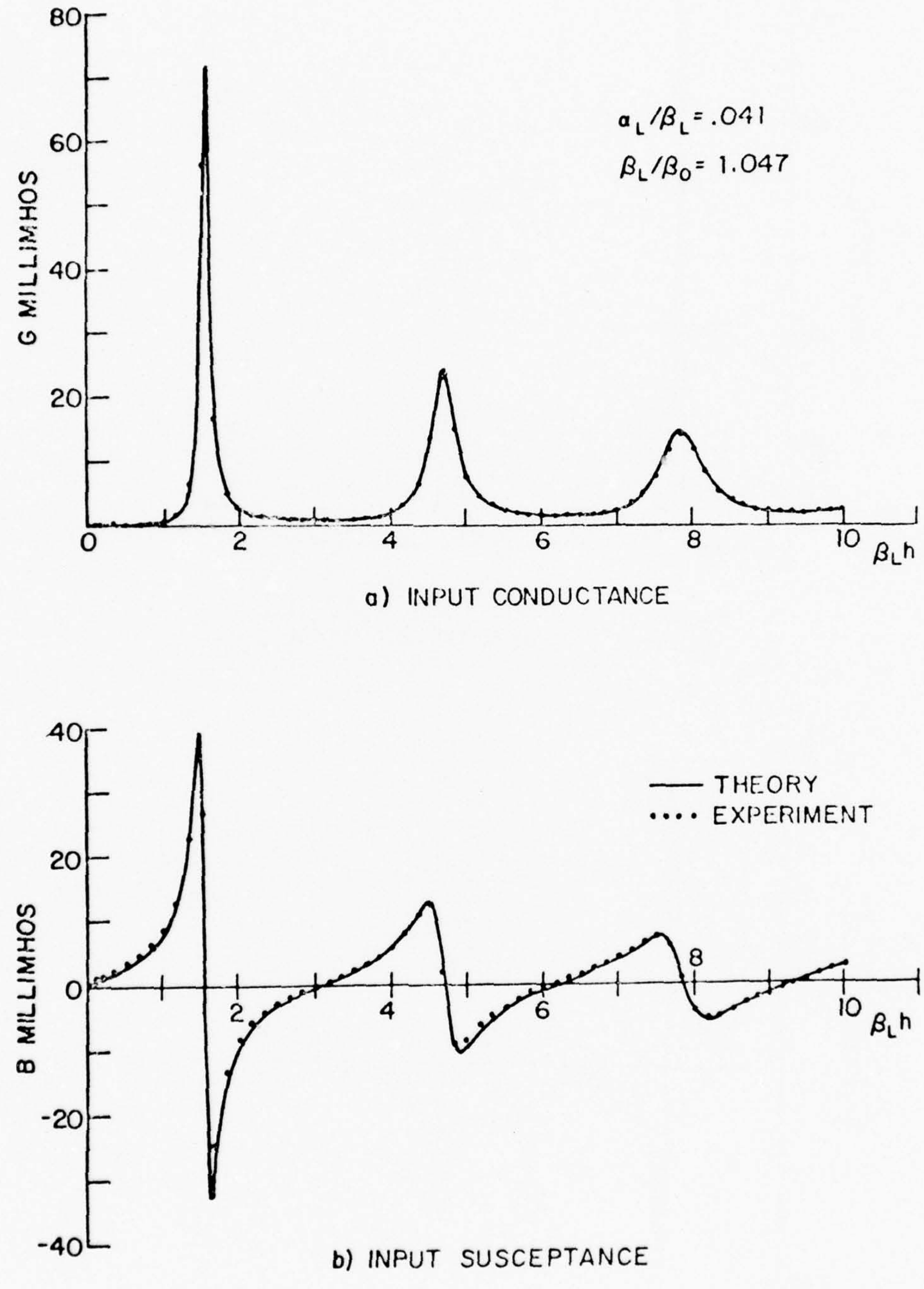


FIG. 3.49. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER; d/λ_0 = .02 AND a/λ_0 = .0015.

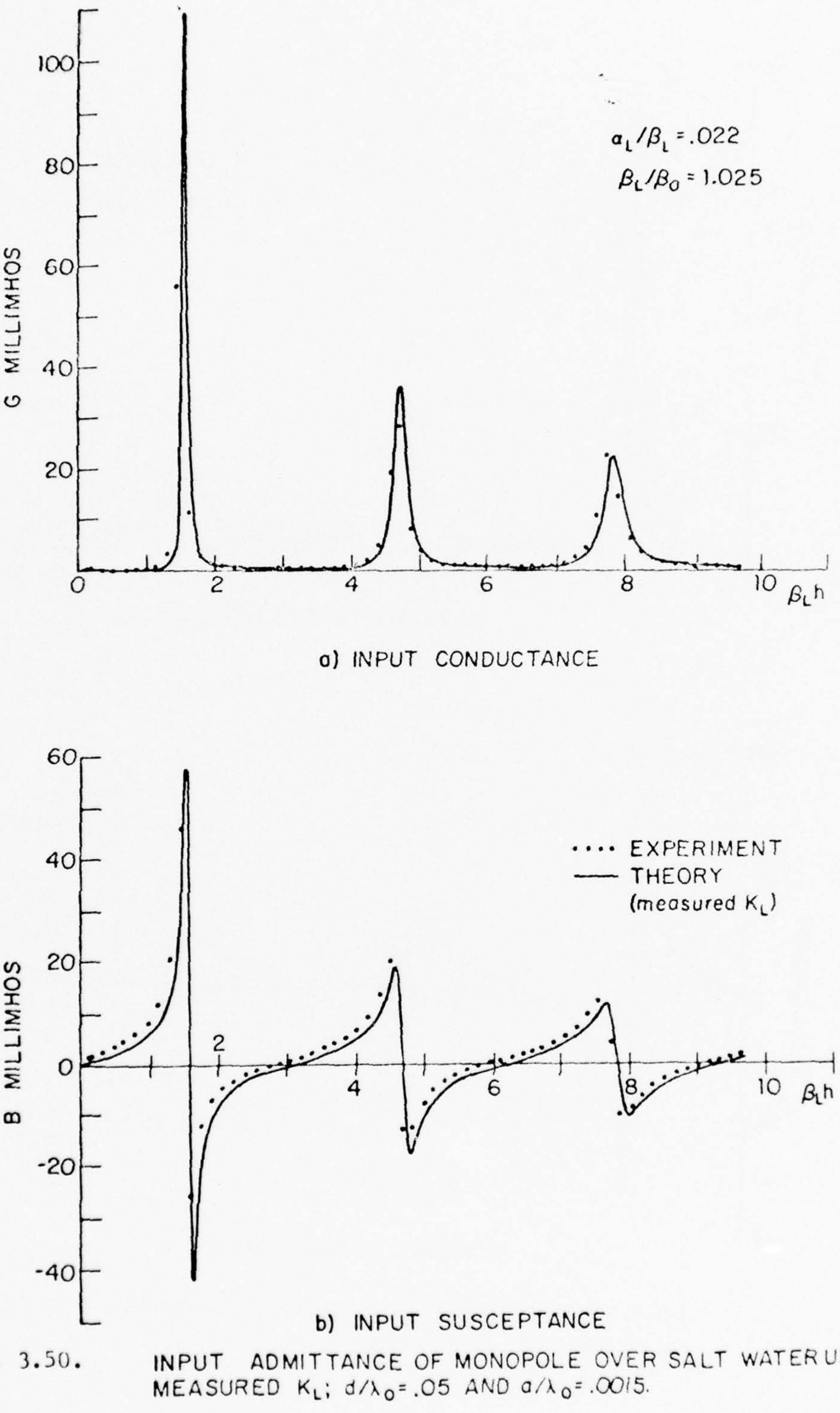


FIG. 3.50. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER USING MEASURED K_L; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$.

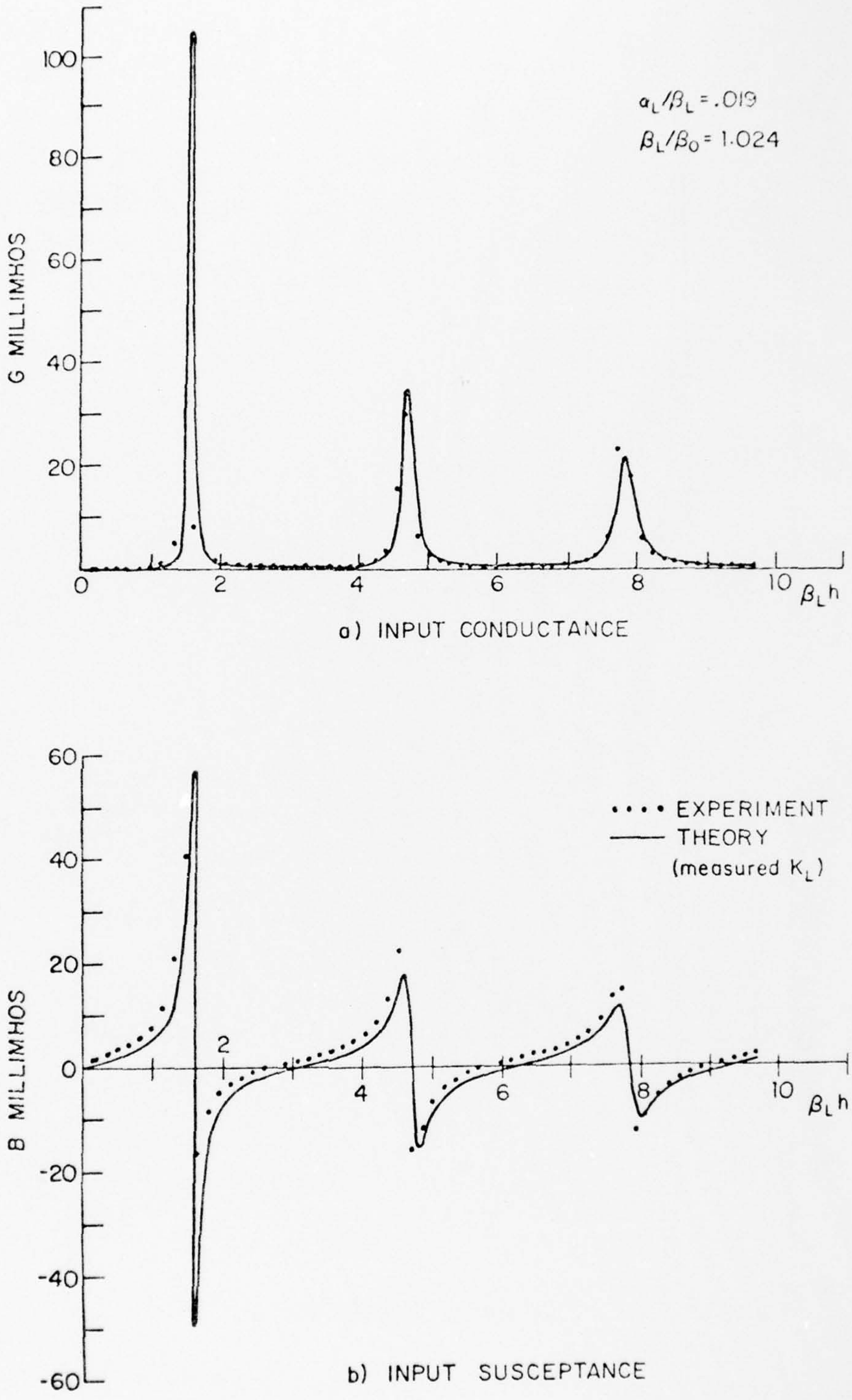
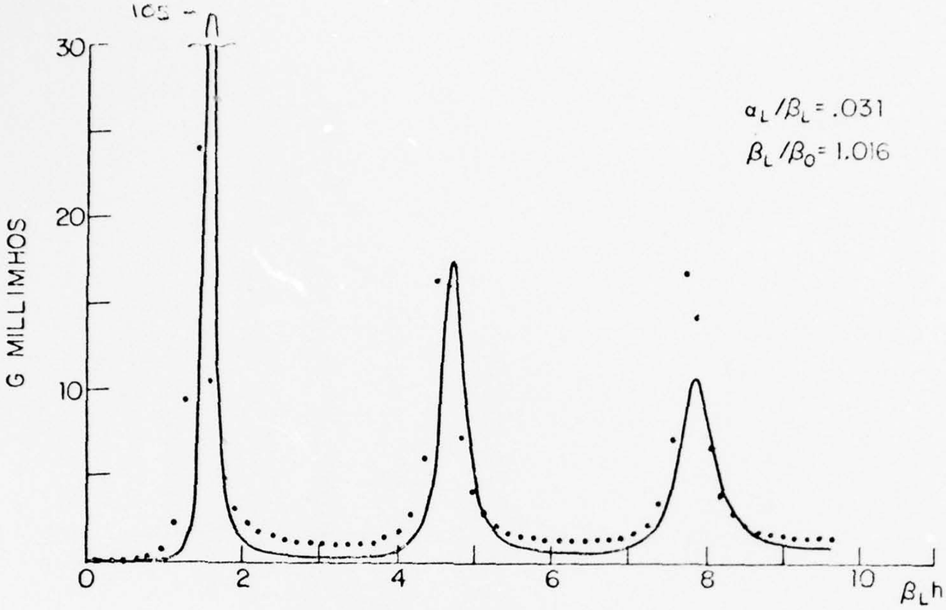
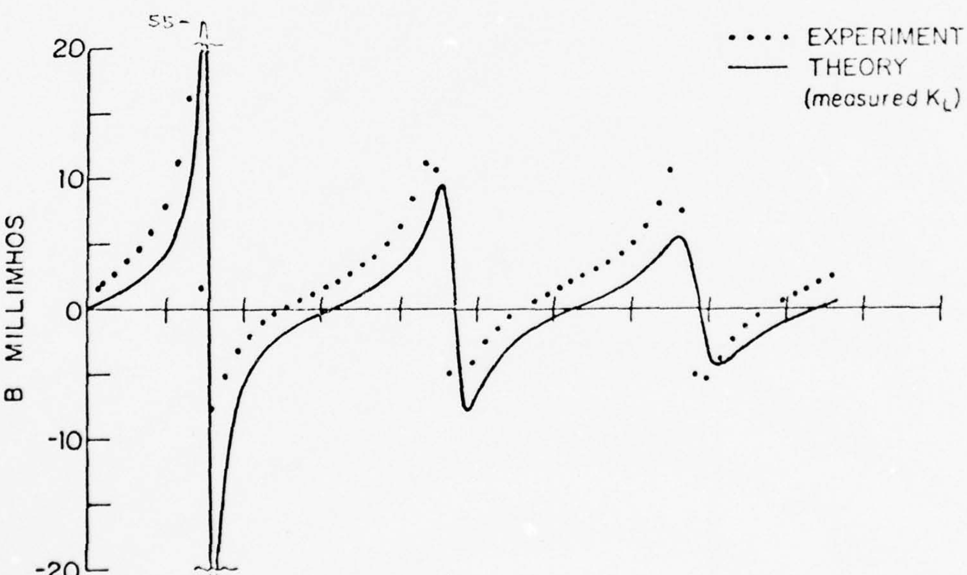


FIG. 3.51. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER USING MEASURED K_L; d/λ_0 = .1 AND a/λ_0 = .0015.



a.) INPUT CONDUCTANCE



b) INPUT SUSCEPTANCE

FIG. 3.52. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER USING MEASURED K_L; d/λ_0 = .25 AND a/λ_0 = .0015.

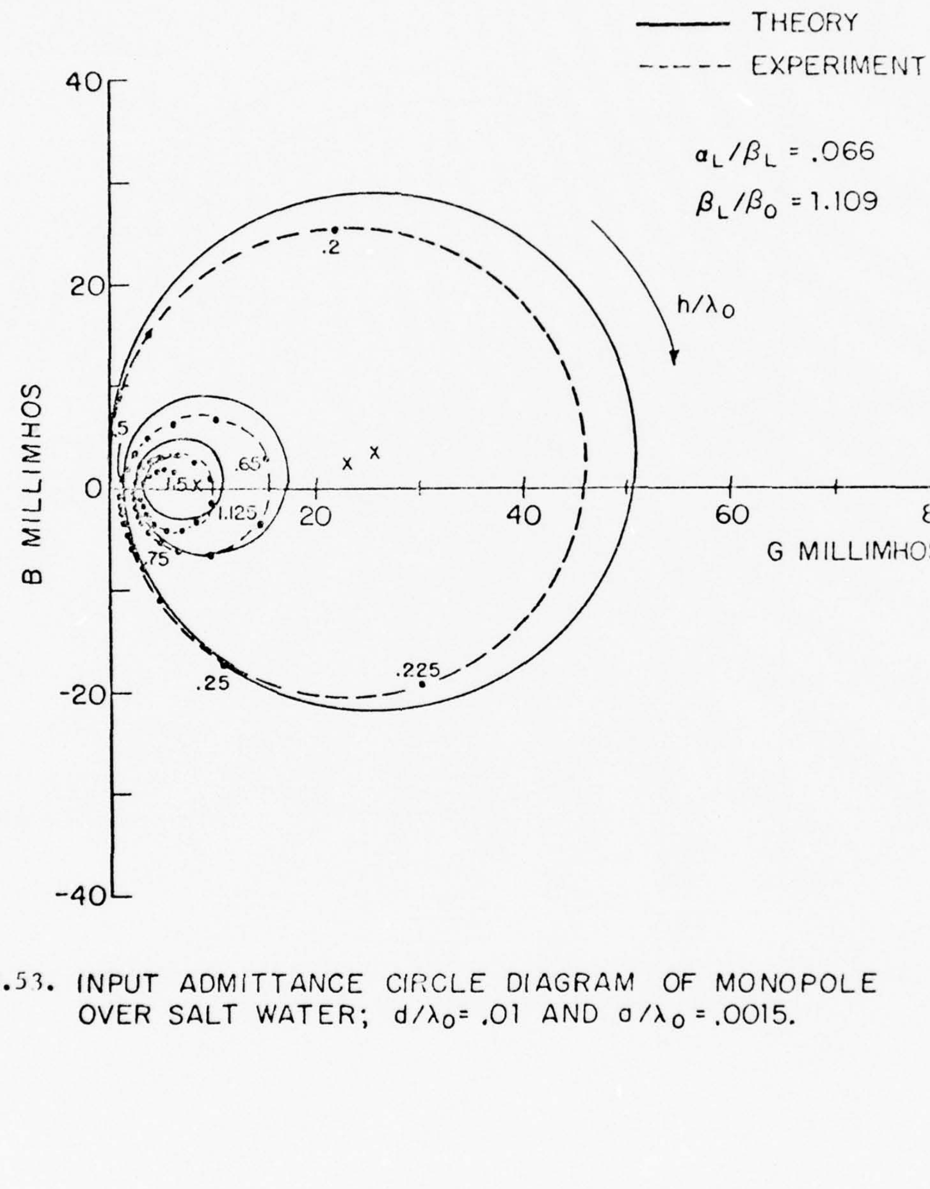


FIG. 3.53. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER; d/λ_0= .01 AND a/λ_0 = .0015.

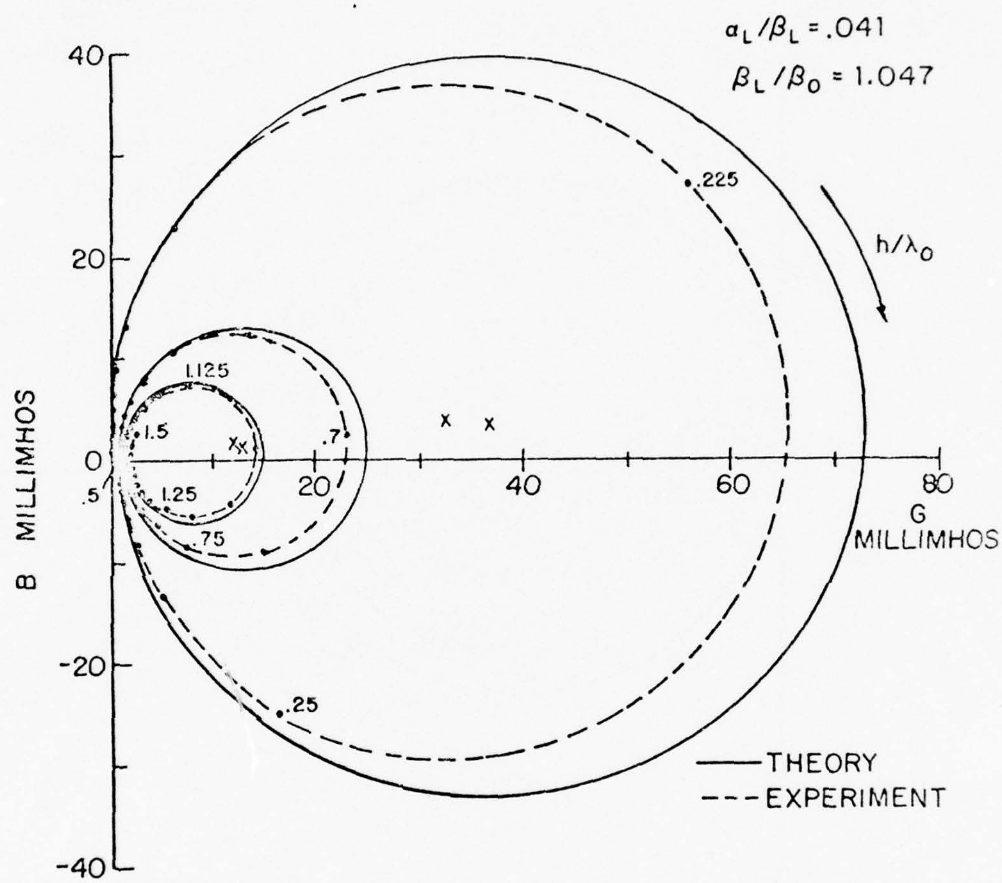


FIG. 3.54. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

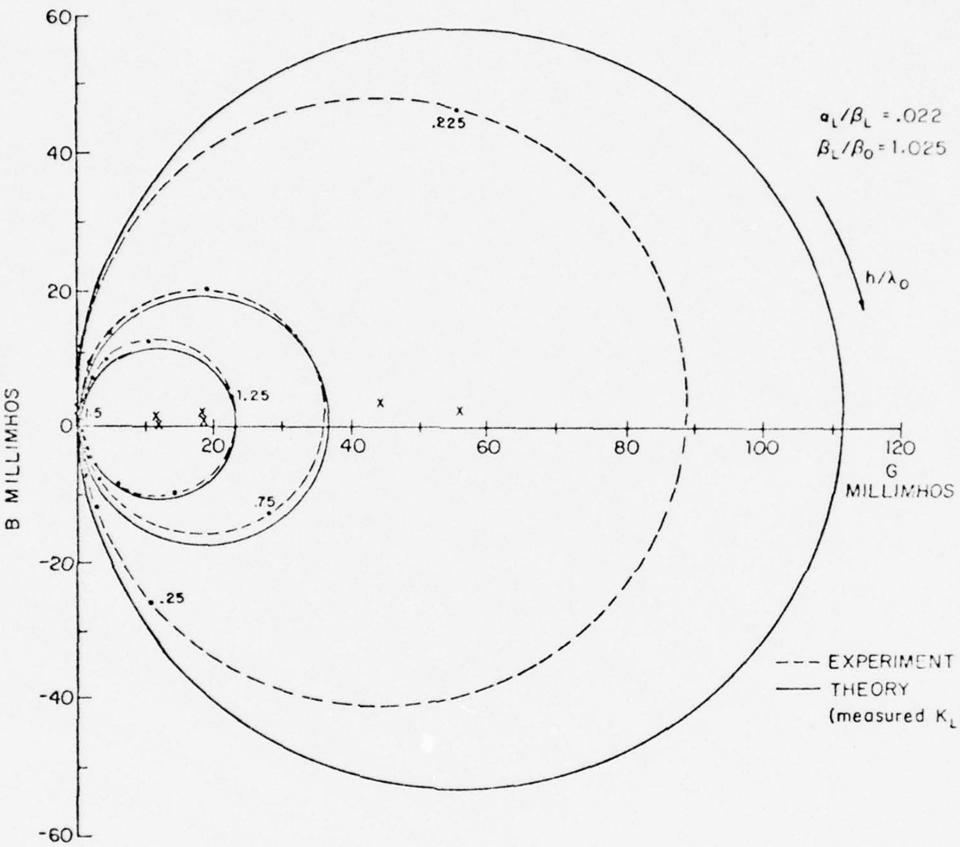


FIG. 3.55. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER USING MEASURED K_L; d/λ_0 = .05 AND a/λ_0 = .0015.

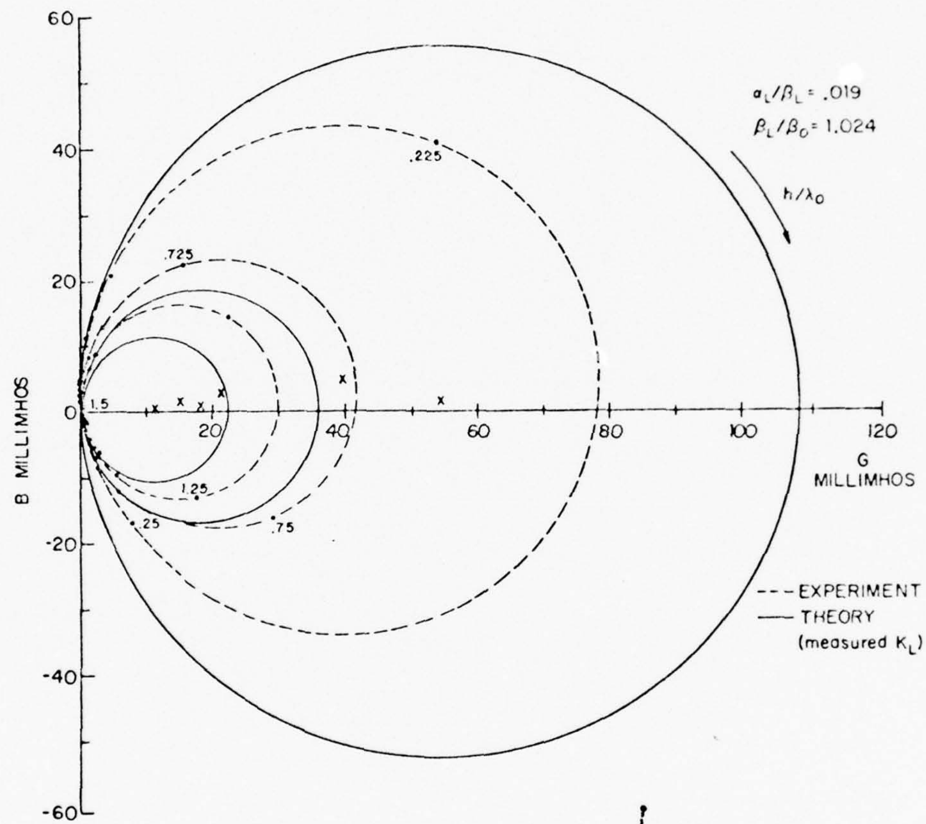


FIG. 3.56. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER USING MEASURED K_L; d/λ_0 = .1 AND a/λ_0 = .0015

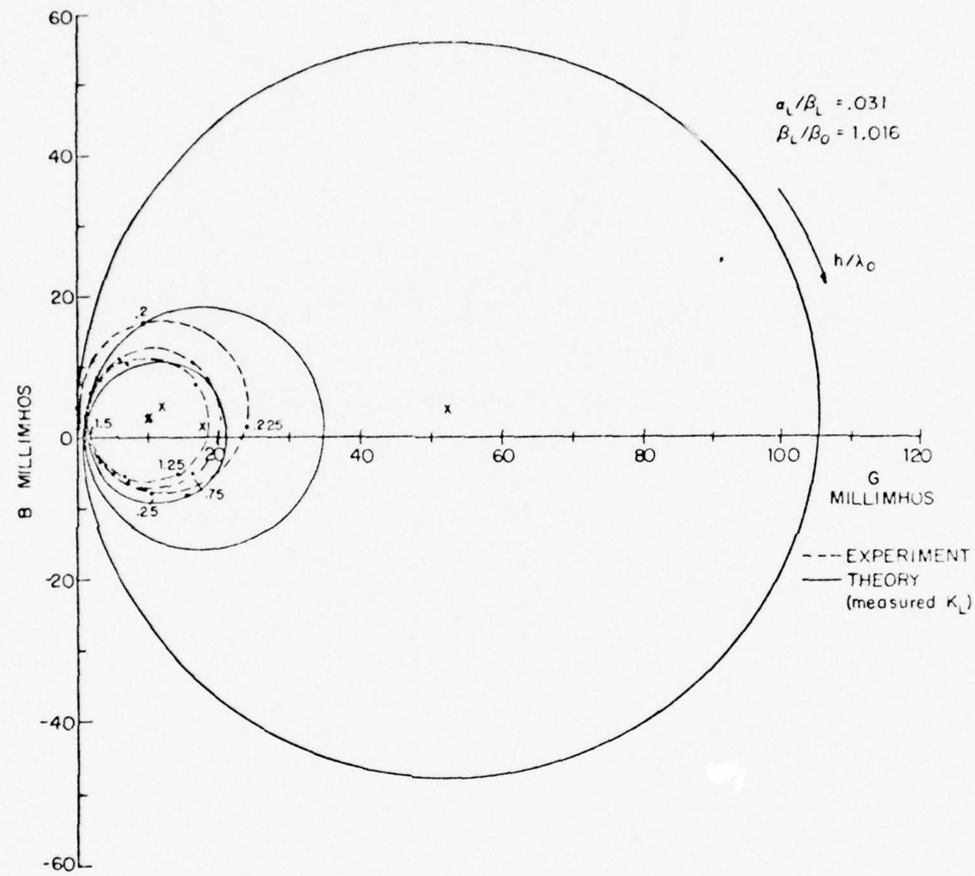


FIG. 3.57. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER USING MEASURED K_L; d/λ_0 = .25 AND a/λ_0 = .0015.

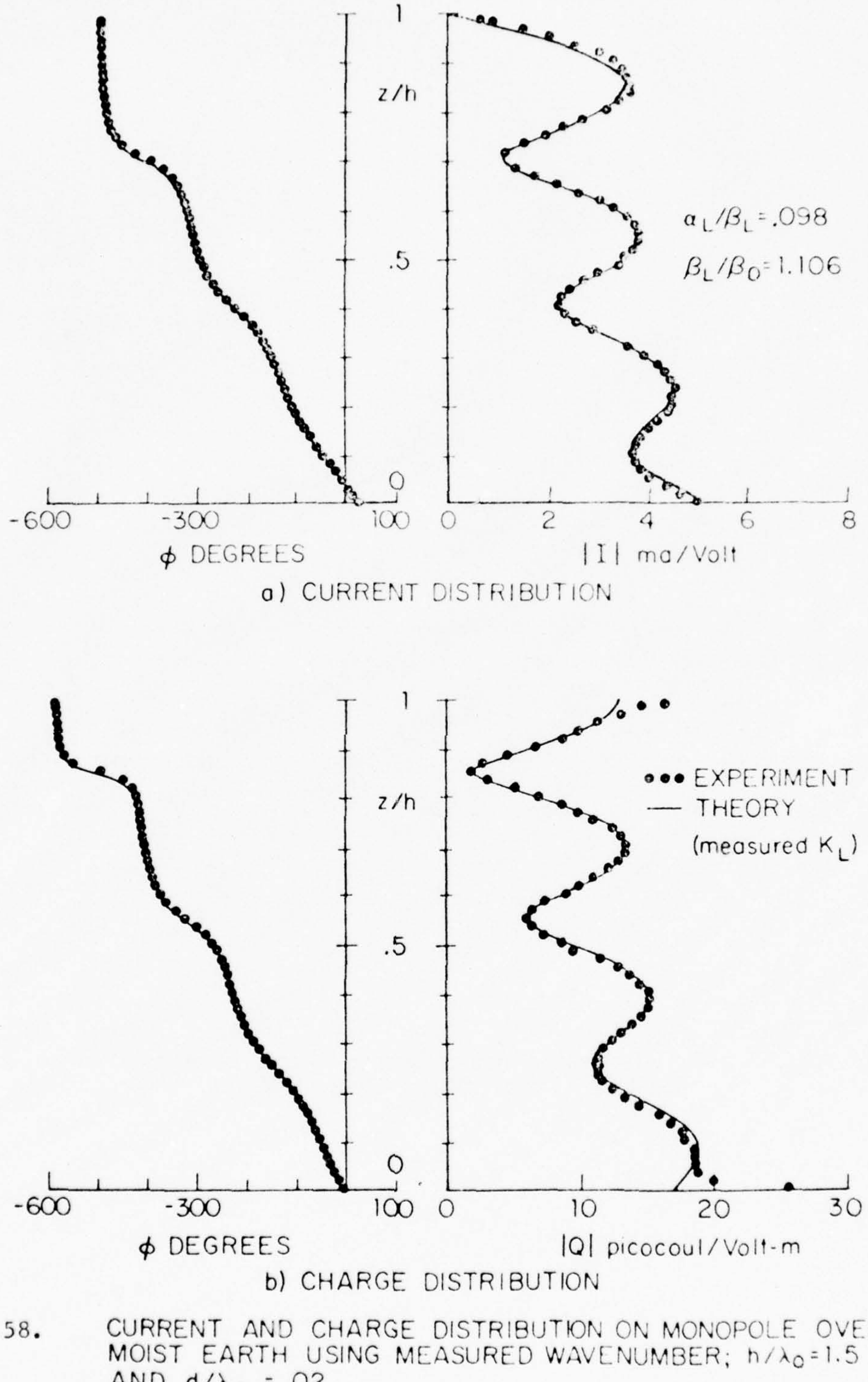
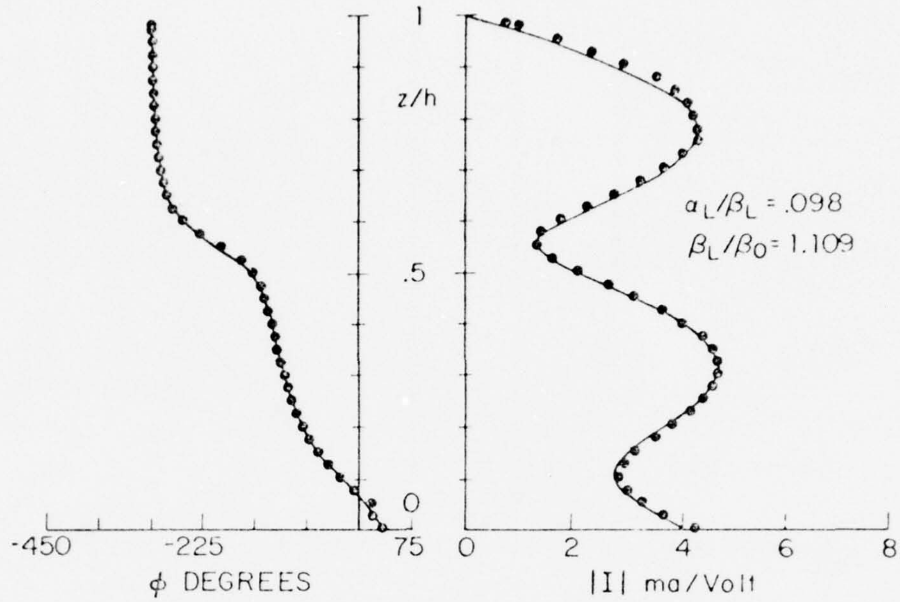
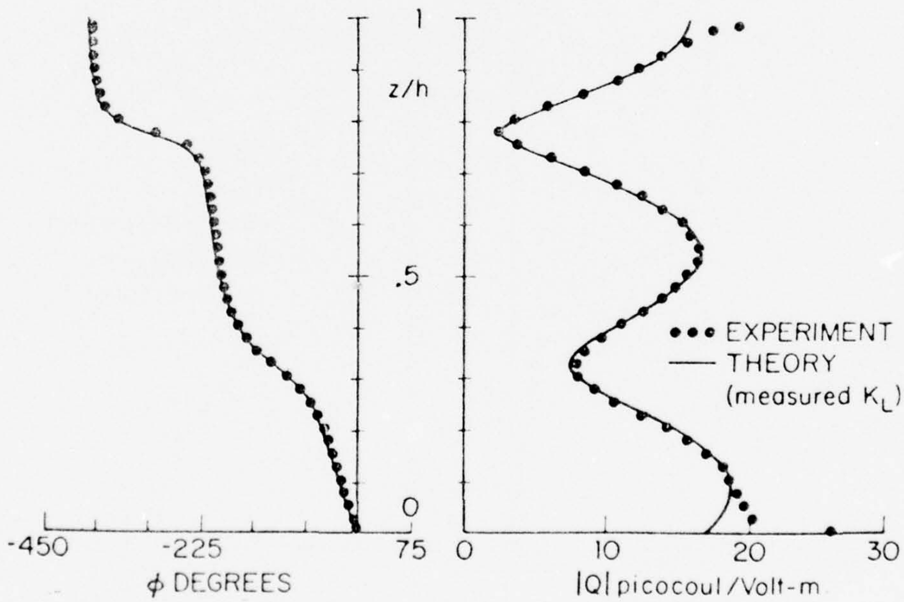


FIG. 3.58. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; h/λ_0=1.5 AND d/λ_0 = .02.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.59. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

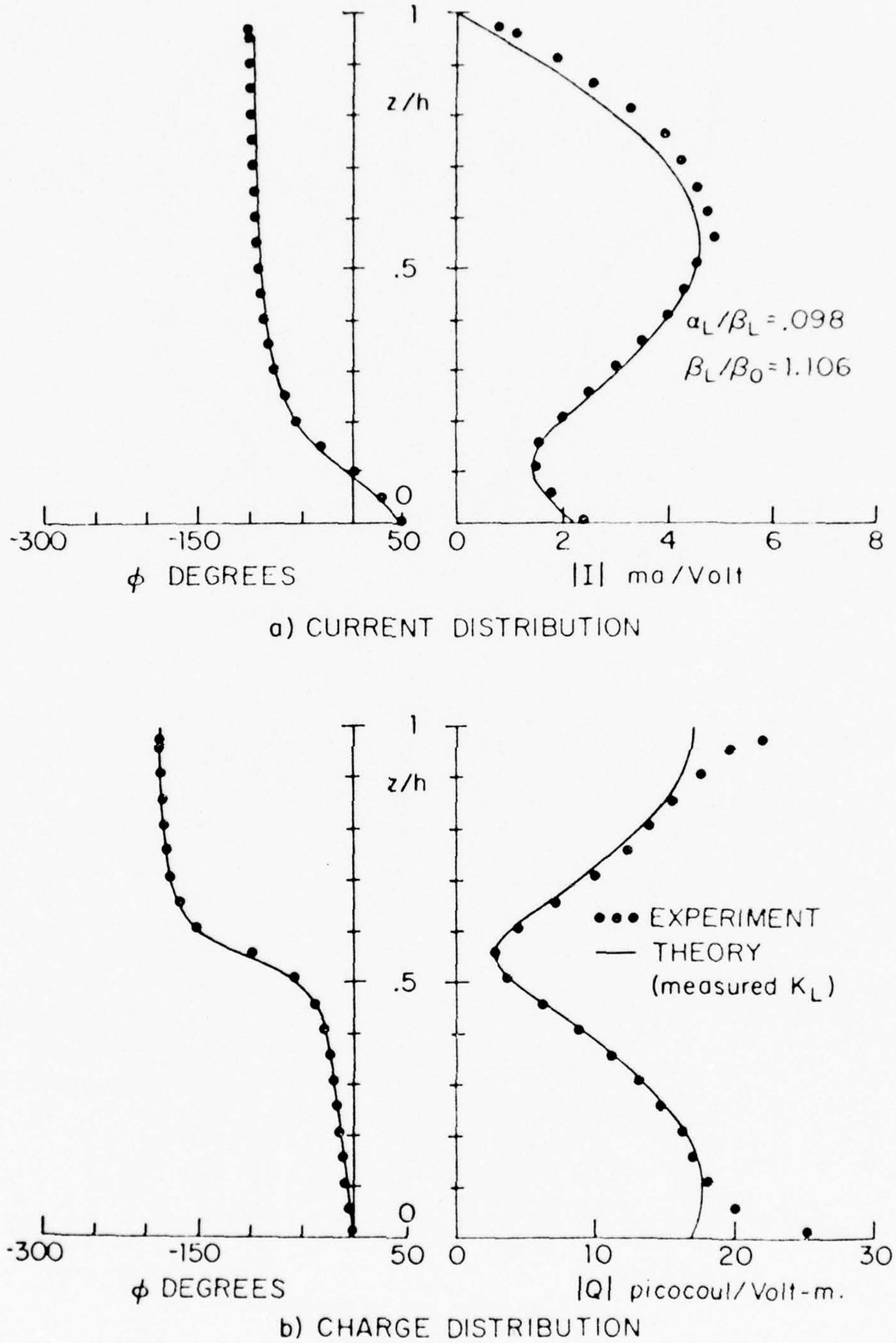


FIG. 3.60. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

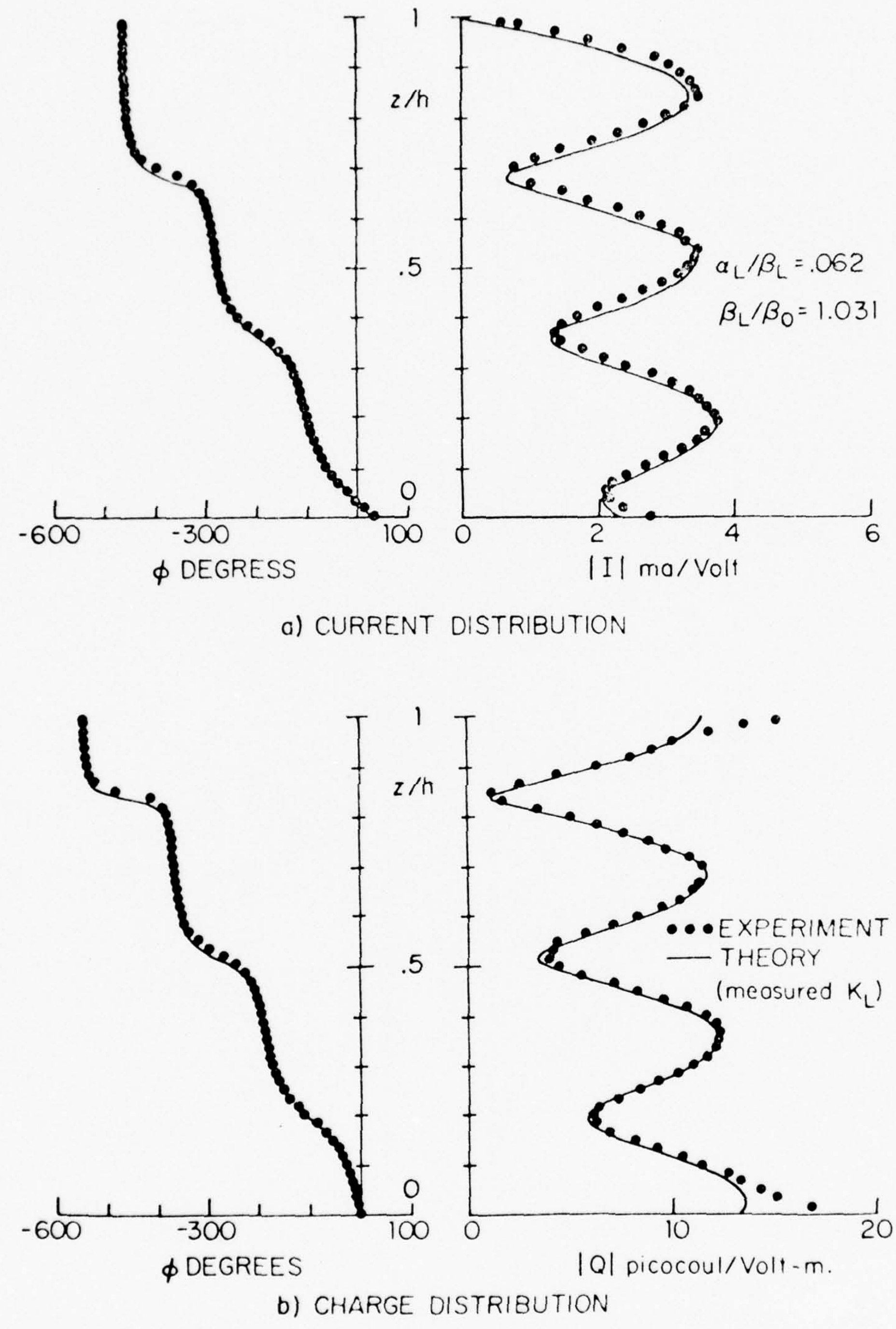
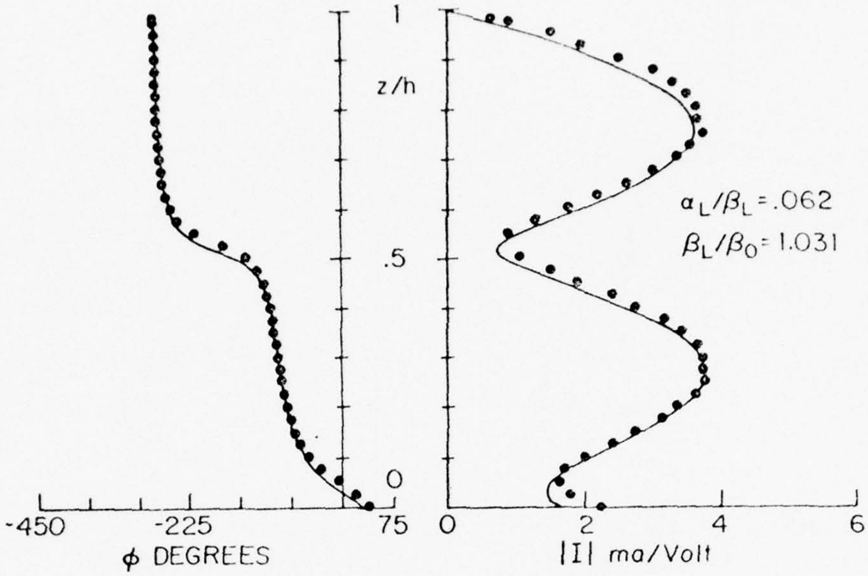
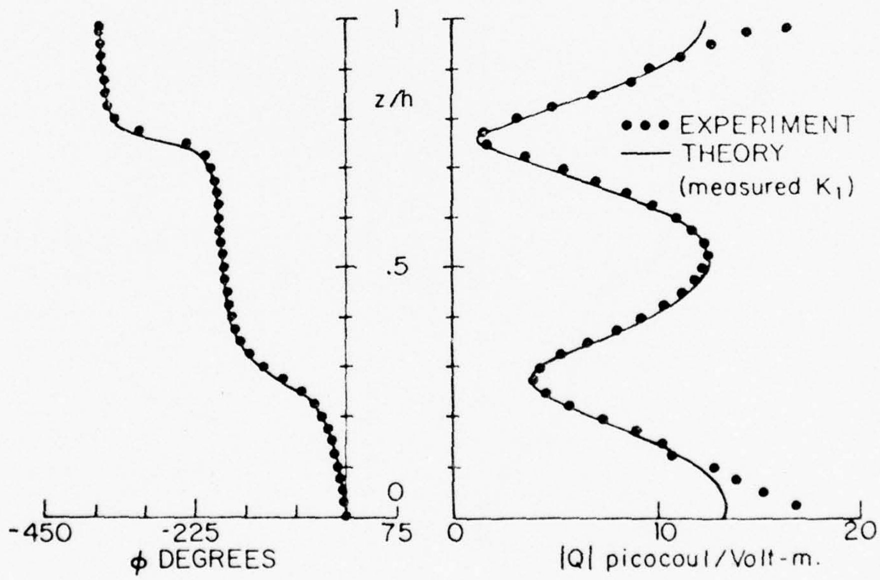


FIG. 3.61. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; h/λ_0=1.5 AND d/λ_0=.05



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.62. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .05$

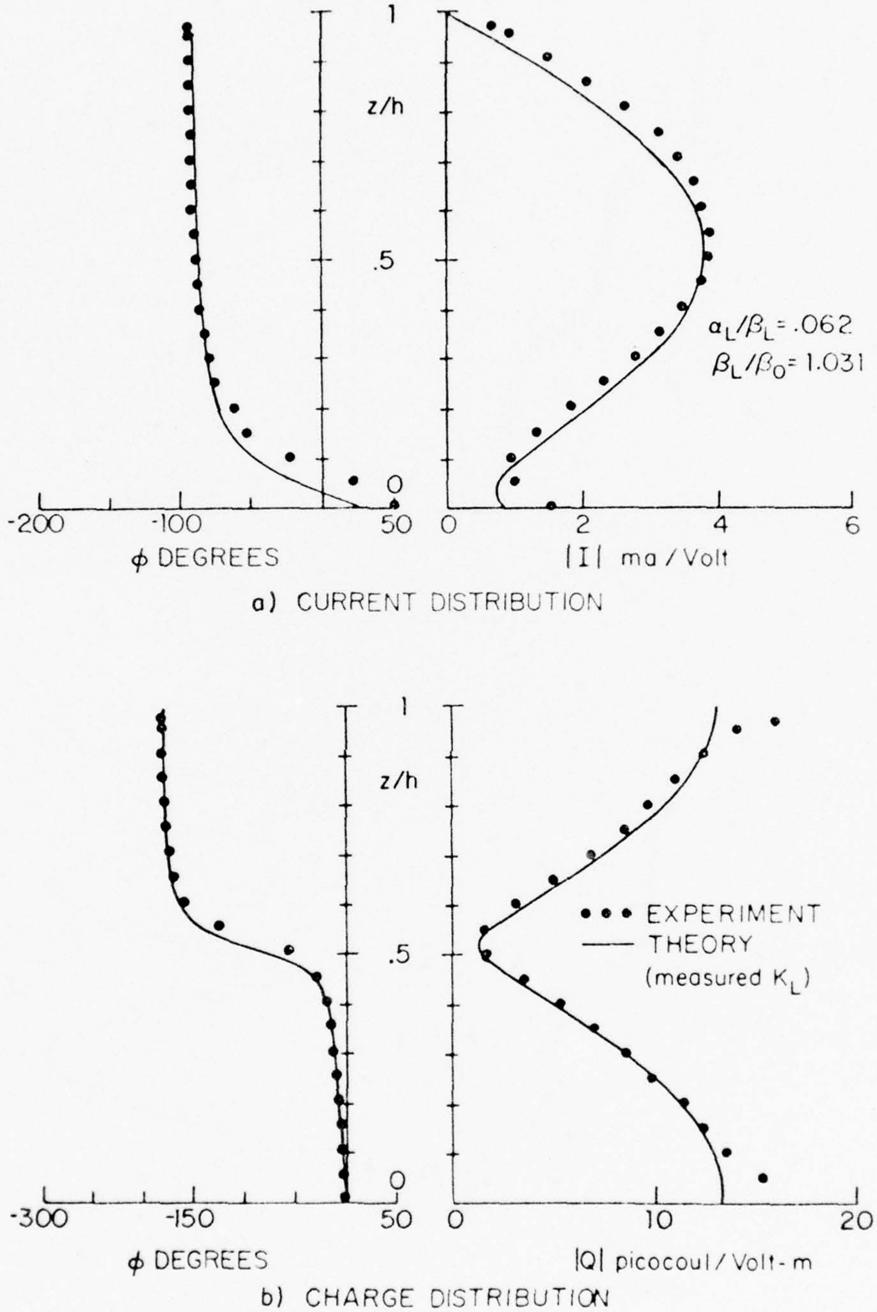
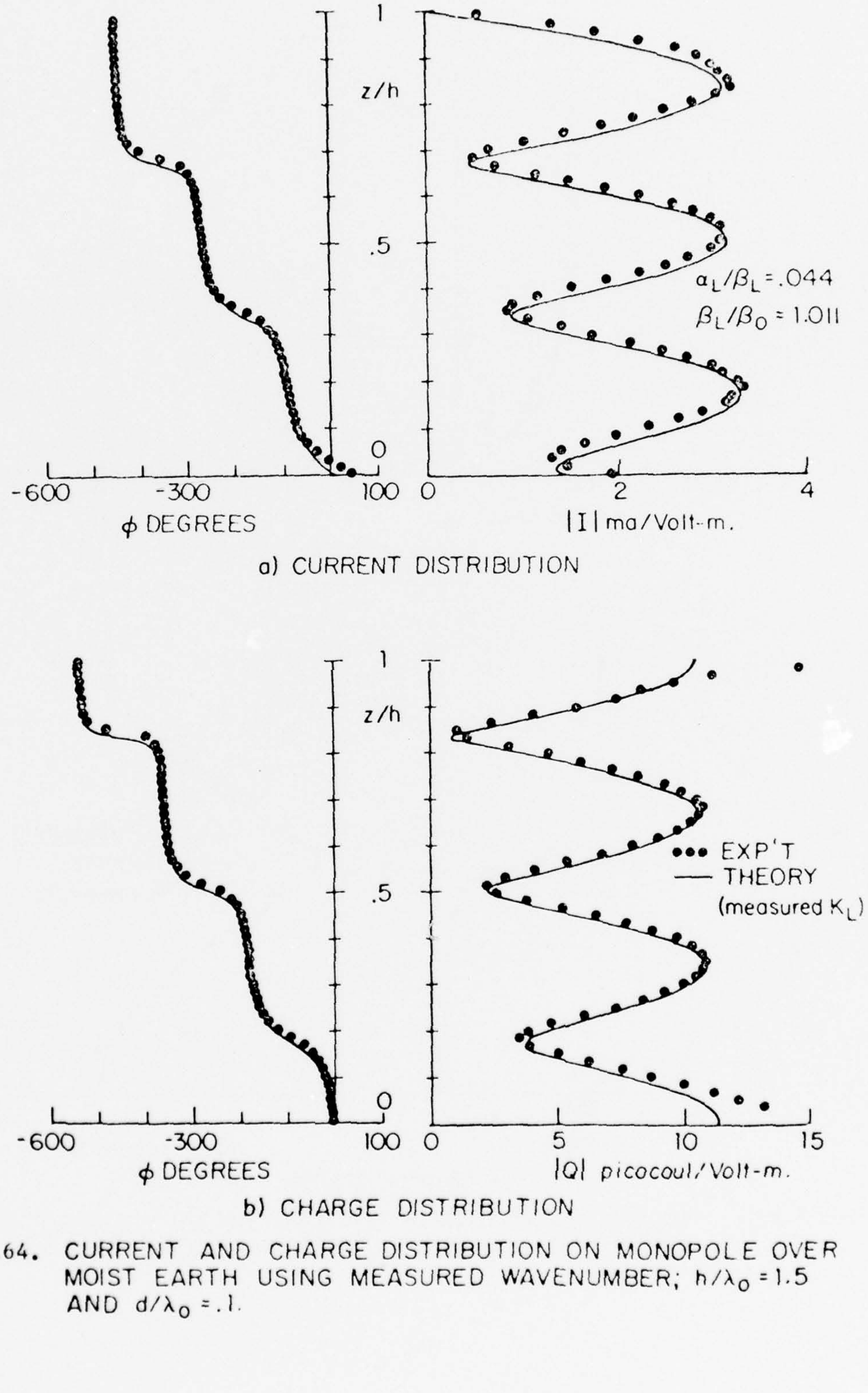


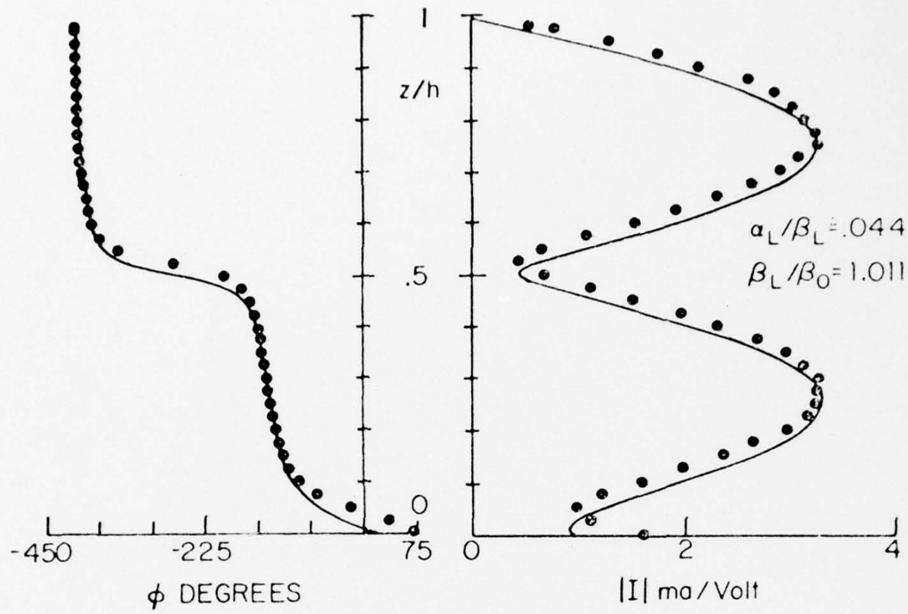
FIG. 3.63. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .05$



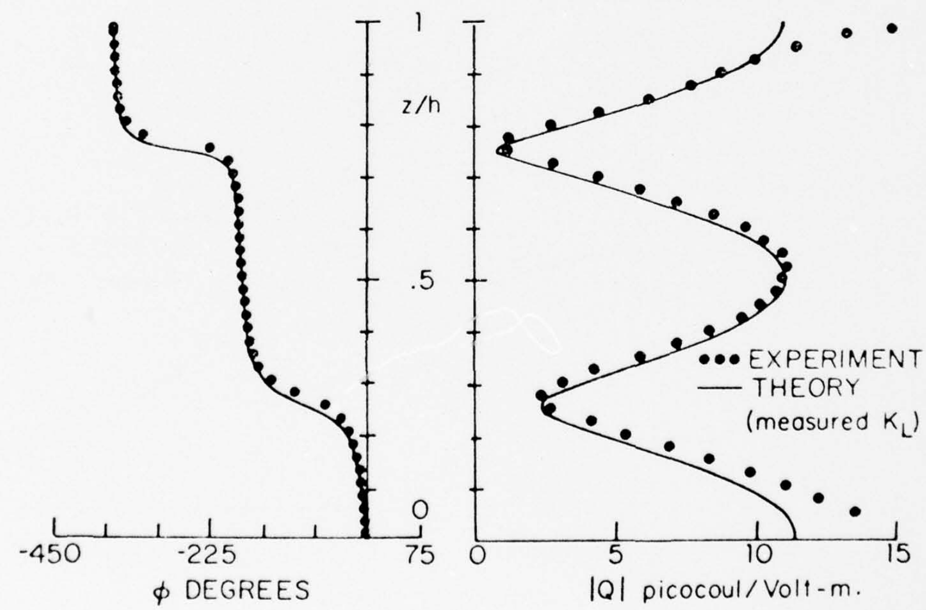
a) CURRENT DISTRIBUTION

b) CHARGE DISTRIBUTION

FIG. 3.64. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.65. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

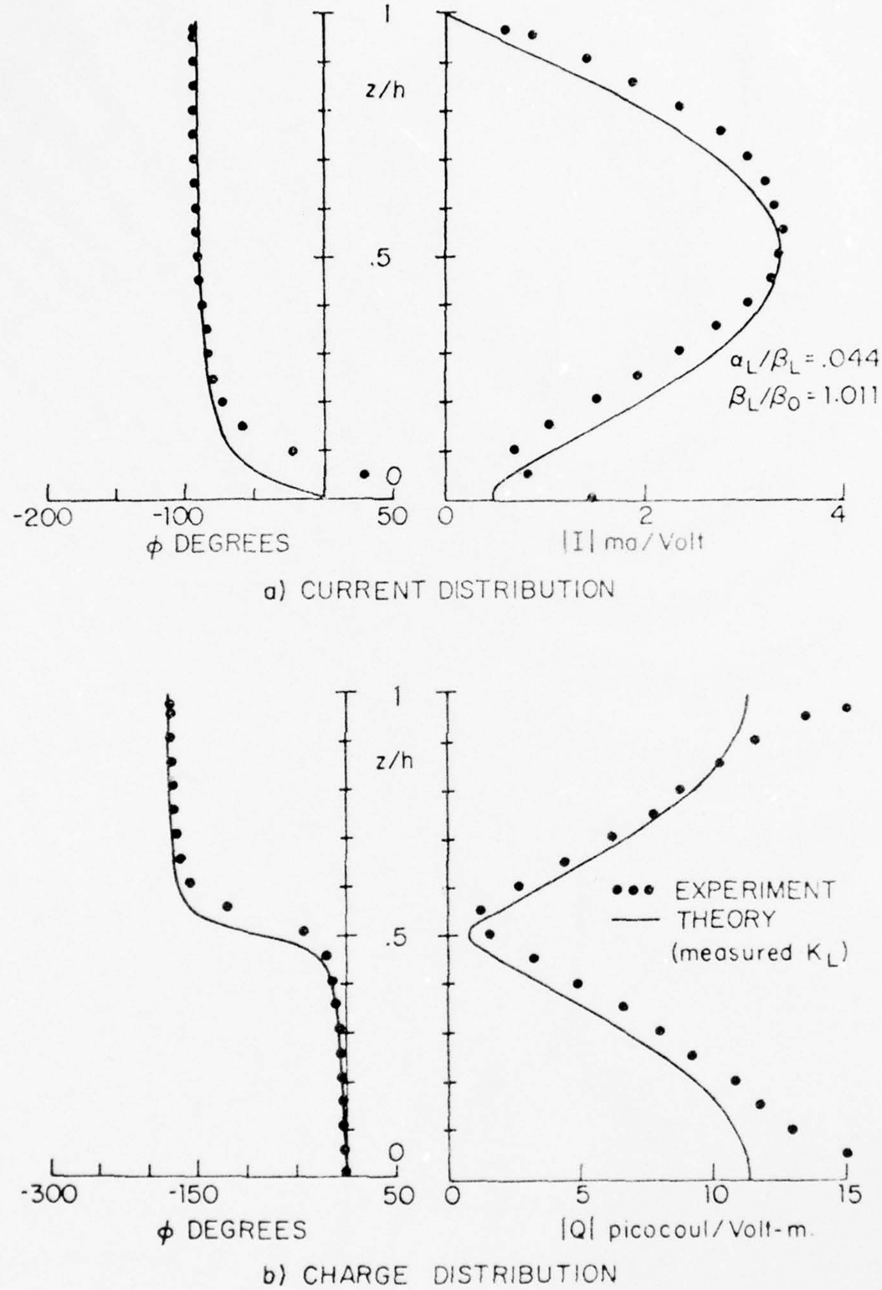


FIG. 3.66. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.

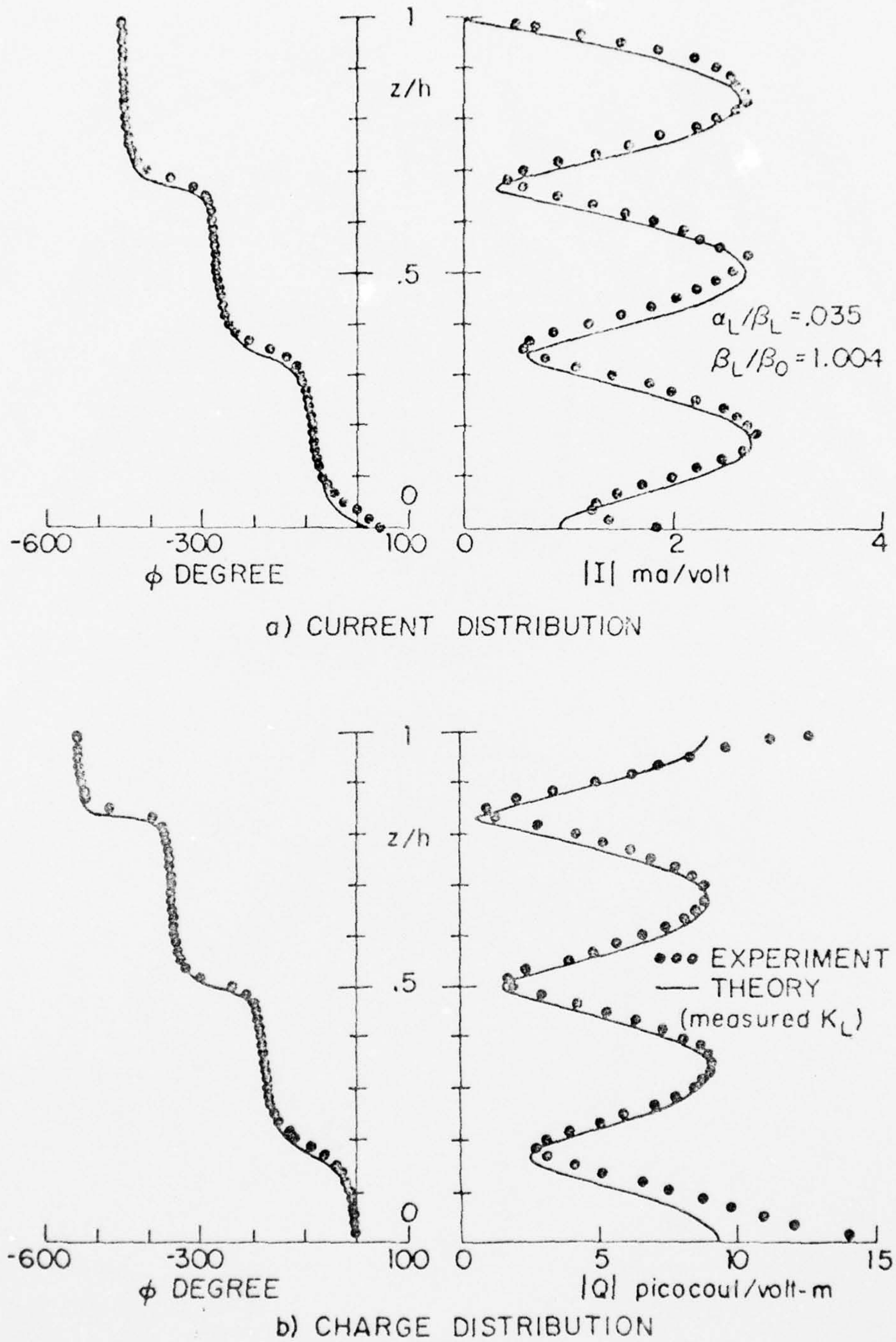


FIG. 3.67. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .29$.

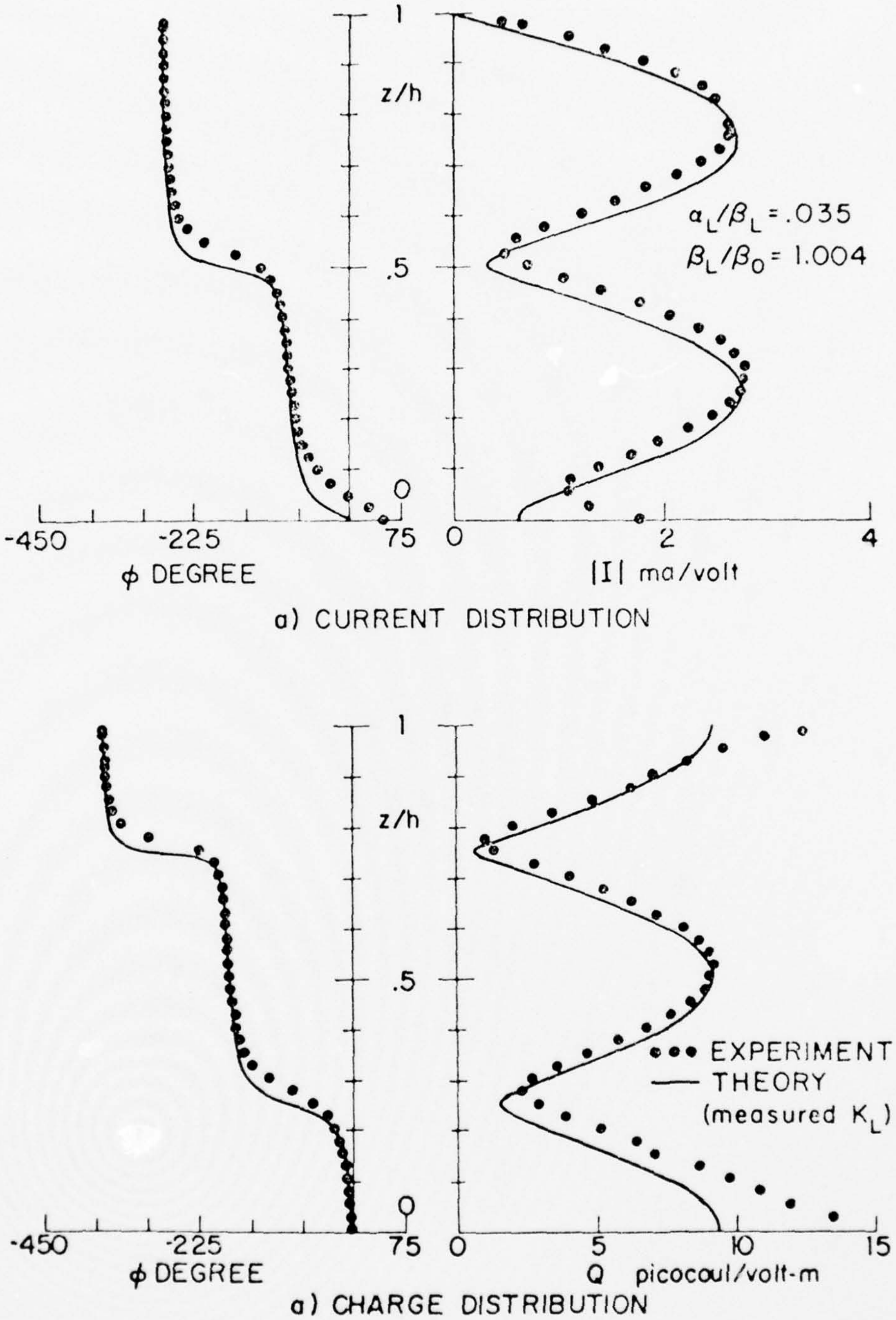


FIG. 3.68. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .29$

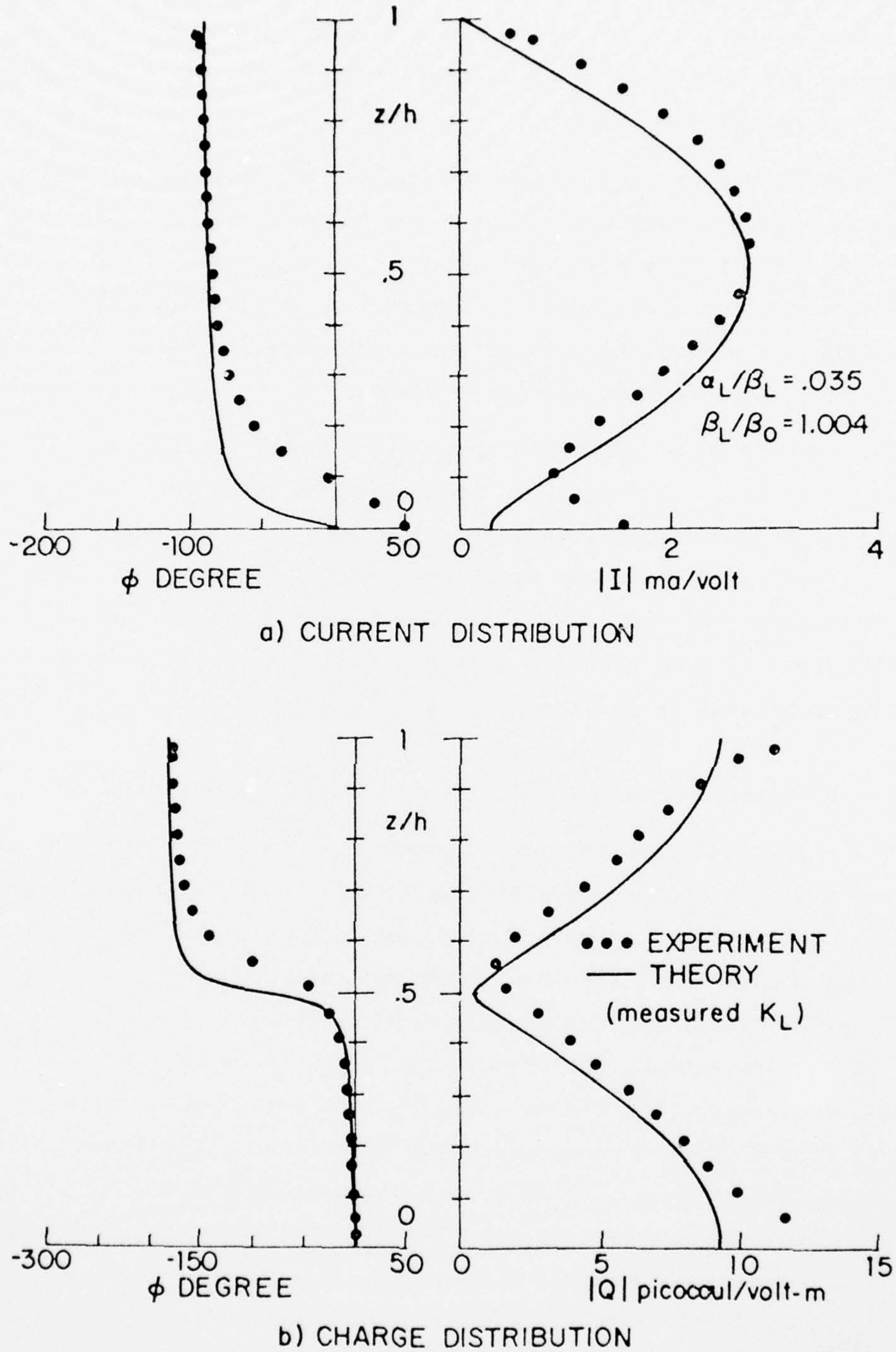


FIG. 3.69. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .29$.

quite good. The $d/\lambda_0 = .25$ measurements have characteristics similar to those taken at the same height over the previous two media. The currents and charges are not strictly sinusoidal in form with the greatest departure observed at the driving point.

Figure 3.70 shows the comparison between the measured effective wave numbers and those predicted by King. For the smallest height measured, $d/\lambda_0 = .02$, the error in the predicted attenuation constant is 35%. It is interesting to note that when comparing antennas at comparable heights above the three different media, the attenuation (radiation loss) is consistently greatest for the wire over the moist earth.

The admittance measurements appear in Figs. 3.71 through 3.78. The agreement for $d/\lambda_0 = .02$ and $.05$ is seen to be quite good considering the limitations of the zeroth-order approximation. At $d/\lambda_0 = .1$, the agreement is not as good as for the two water cases, especially in the second and third resonance. As before, the zeroth-order admittance for $d/\lambda_0 = .25$ clearly cannot give an accurate approximation. The data for the measured admittances as well as for the currents and charges appear in Appendix B.

3.4. Presentation of Measured Data for the Modified Beverage Wave Antenna

The measurements in Section 3.3 were repeated for an antenna terminated in a resistor and quarter-wave section to form the modified Beverage antenna. The data are presented in an identical manner. All the measured data, both normalized and unnormalized, are contained in Appendix B. For the current and charge distributions data points were taken every 5 cm ($.05\lambda_0$) to obtain accurate representations for these quantities. When the antenna is properly matched, the current and charge distributions are smoothly varying and measurements spaced every 5 cm provide good resolution. The input admittance at each height was measured for only four antenna lengths ($\ell_1/\lambda_0 = 1.5, 1.0, .5$ and $.25$). With proper matching the input admittance remains practically constant for increasing antenna lengths. The four admittances were measured essentially to demonstrate the traveling-wave nature of the modified Beverage antenna.

For all cases the best match condition was obtained basically by trial and error. The appropriate quarter-wave section could be ascertained from the measured wave number. Once this was determined, different resistors

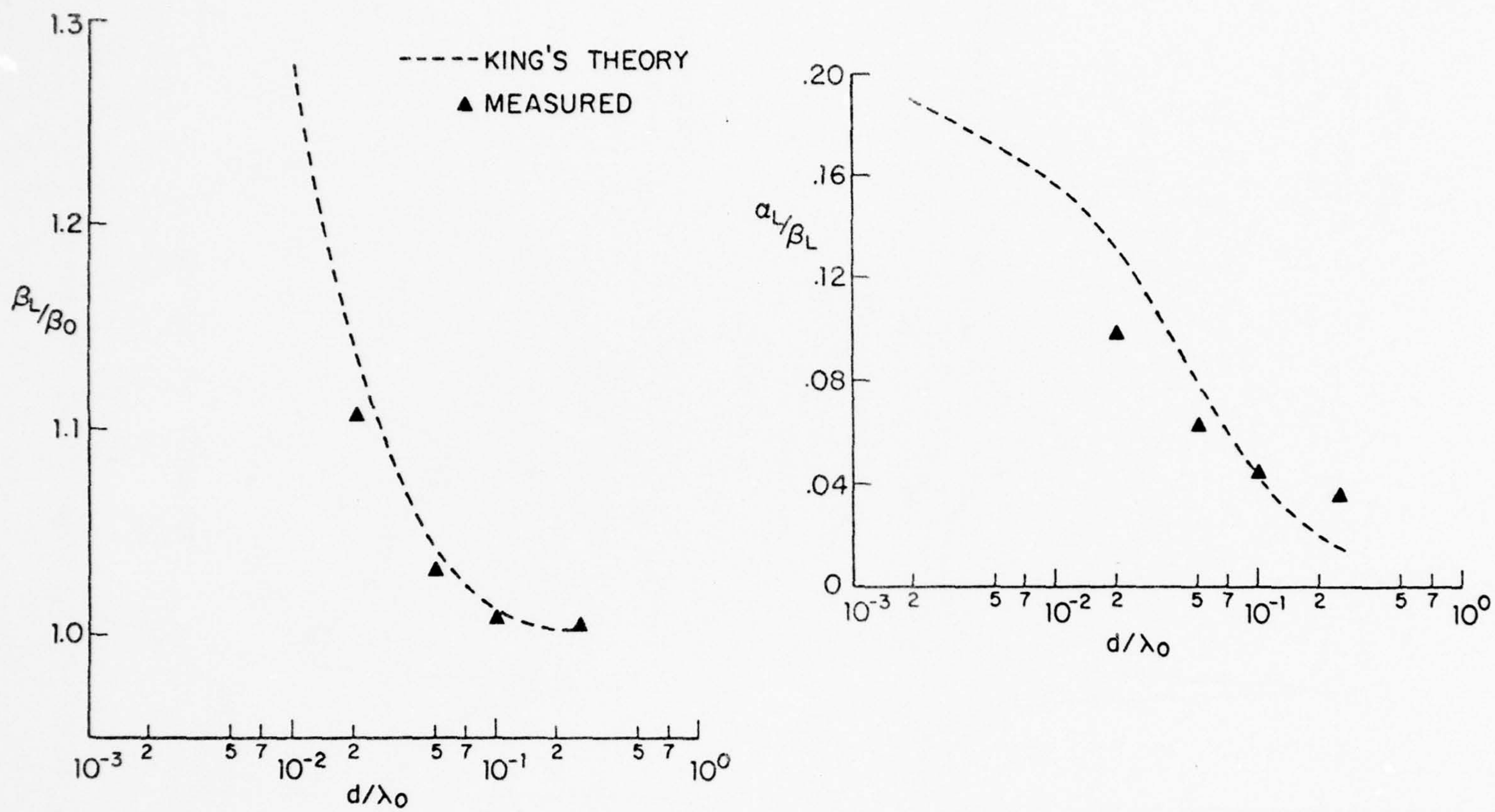
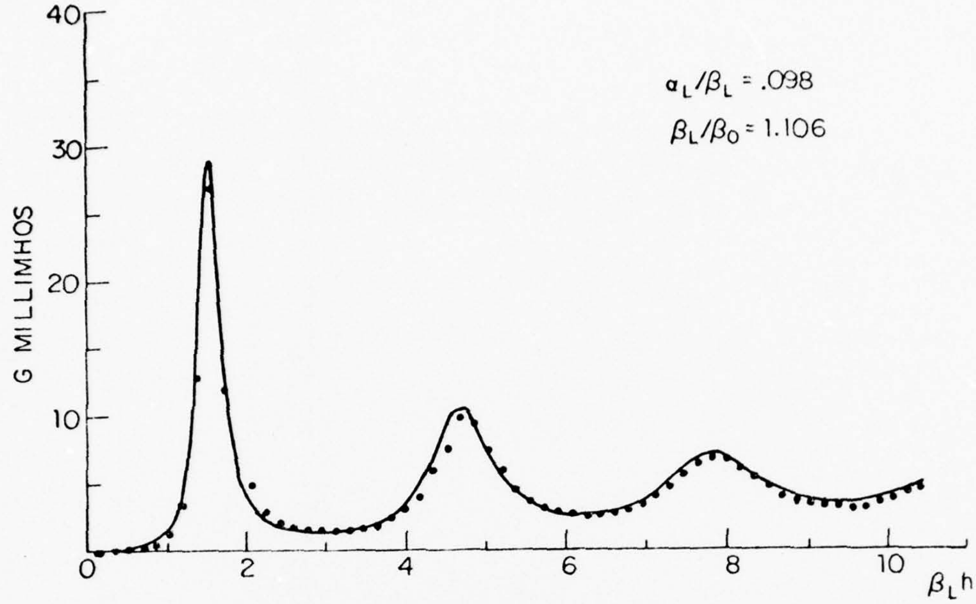
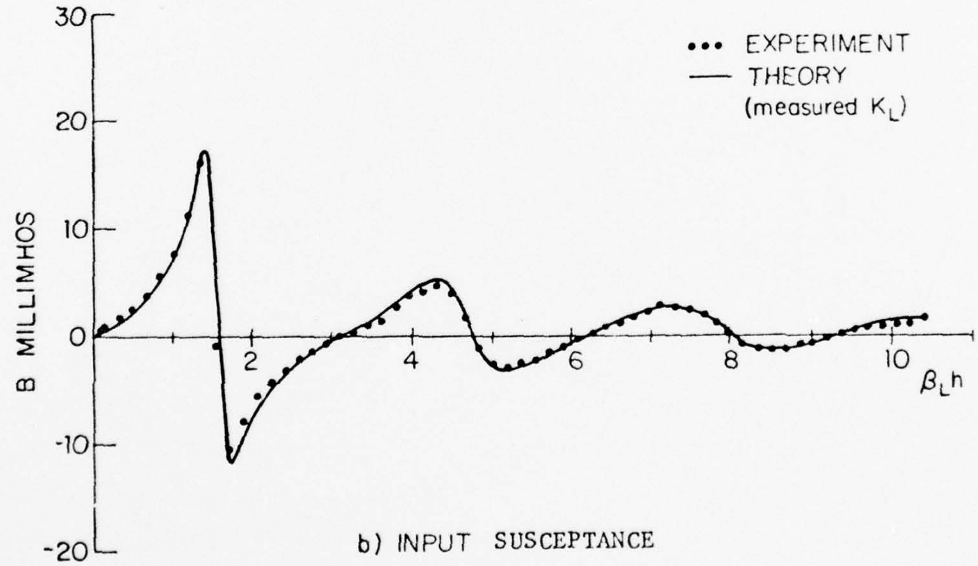


FIG. 3.70. WAVENUMBER ON HORIZONTAL WIRE OVER MOIST EARTH; $\varepsilon r = 11.5$ AND $Pe = .012$.



a) INPUT CONDUCTANCE



b) INPUT SUSCEPTANCE

FIG. 3.71. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$

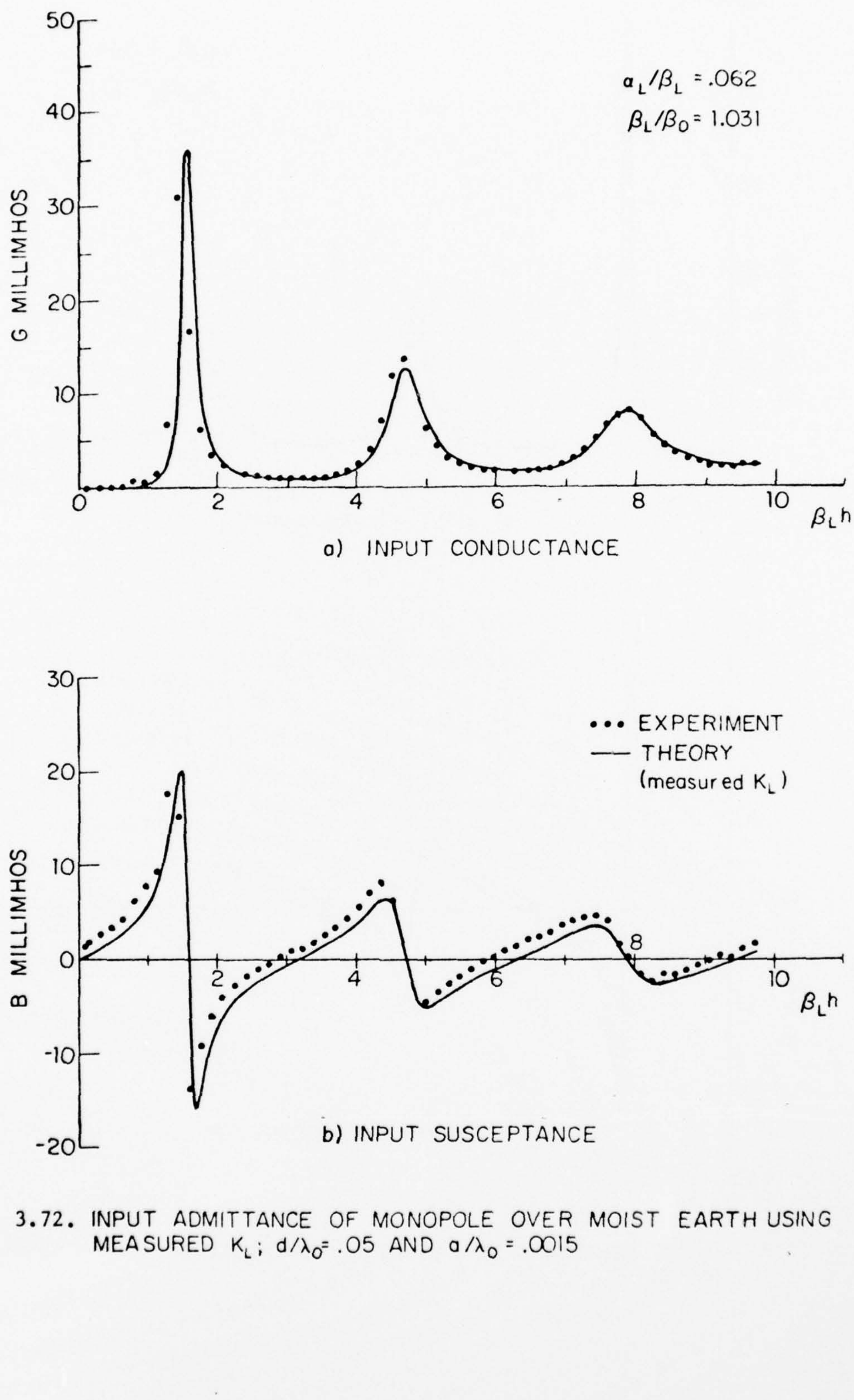


FIG. 3.72. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L; d/λ_0 = .05 AND a/λ_0 = .0015

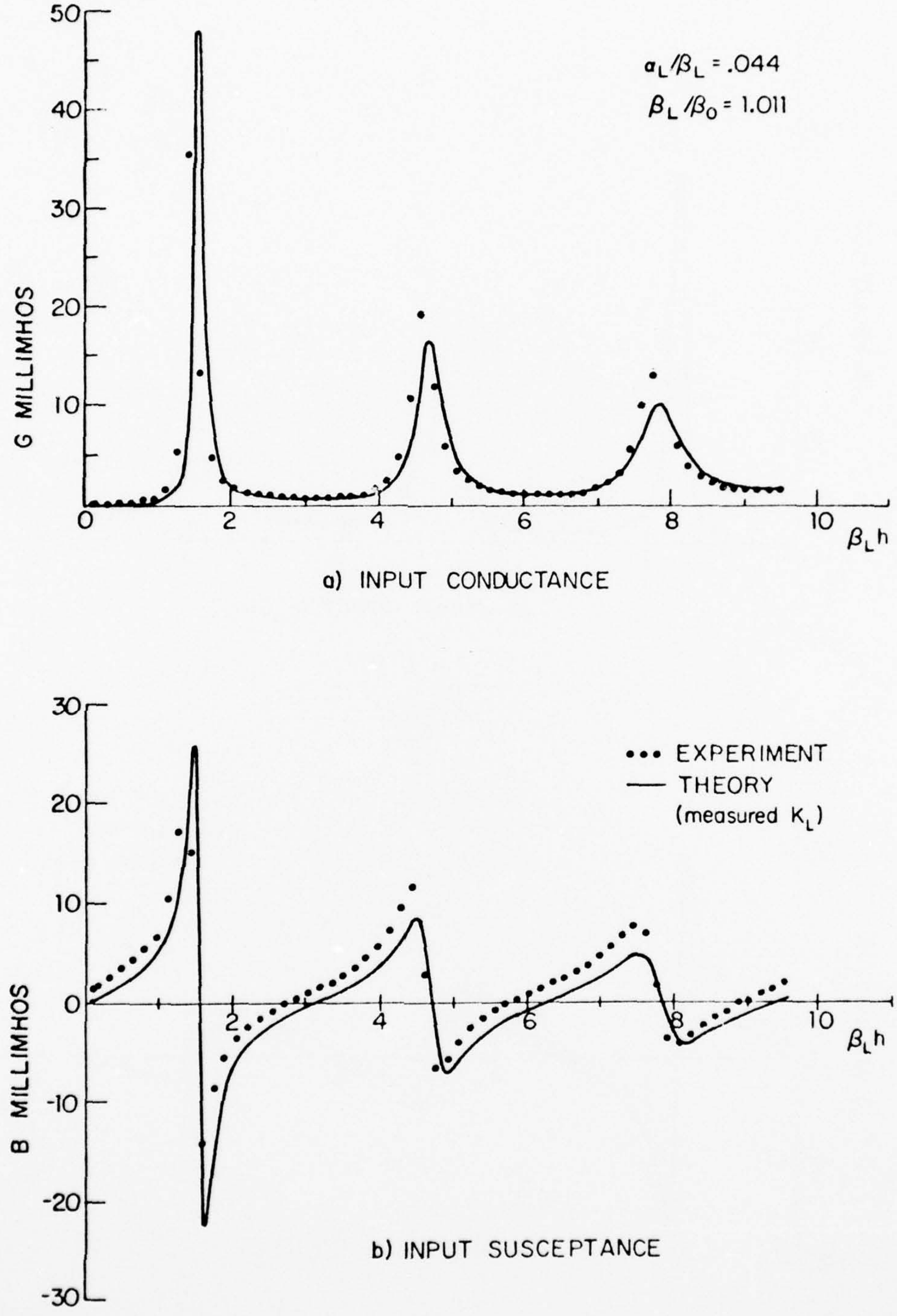


FIG. 3.73. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$

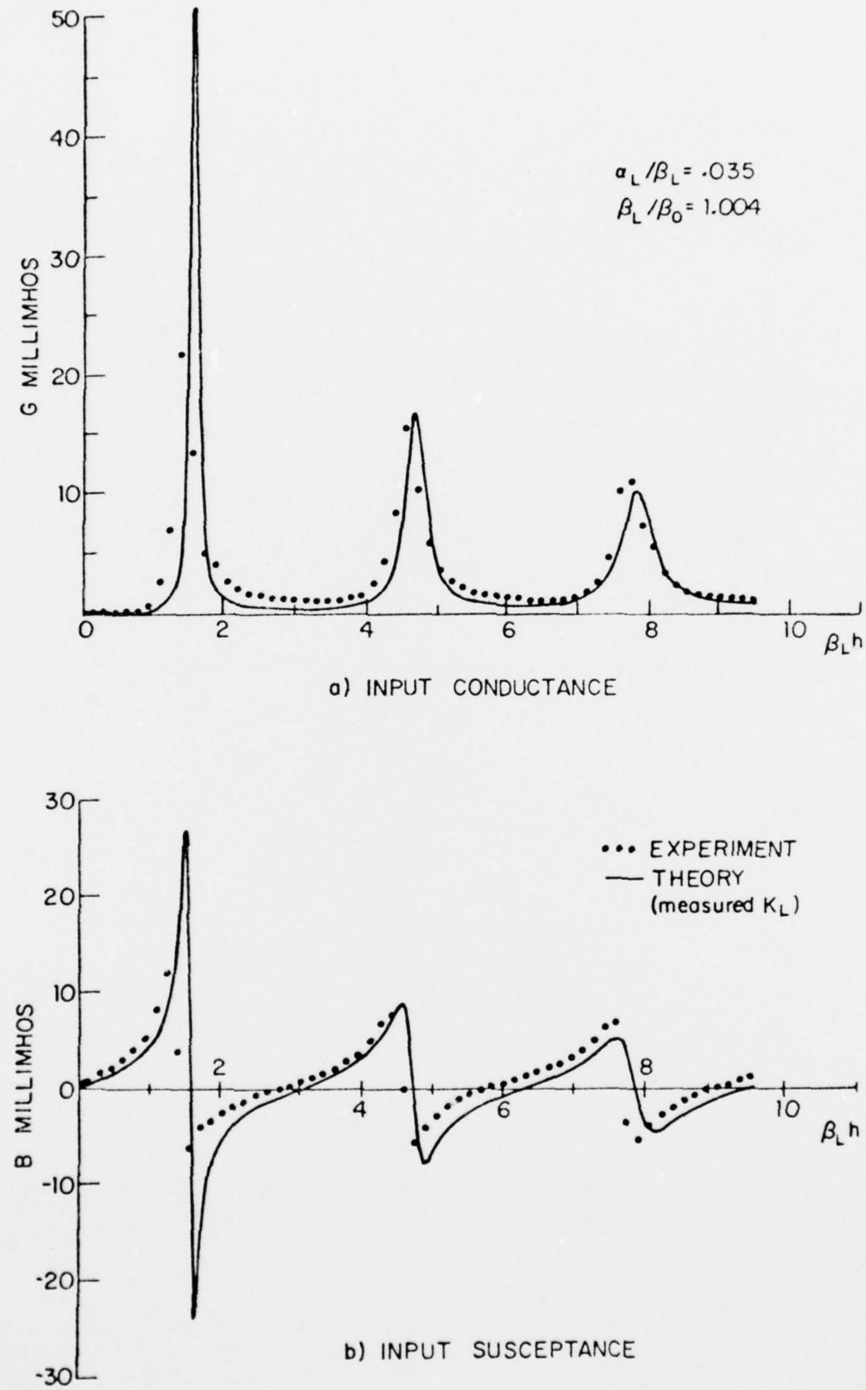


FIG. 3.74. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L; $d/\lambda_0 = .29$ AND $a/\lambda_0 = .0015$.

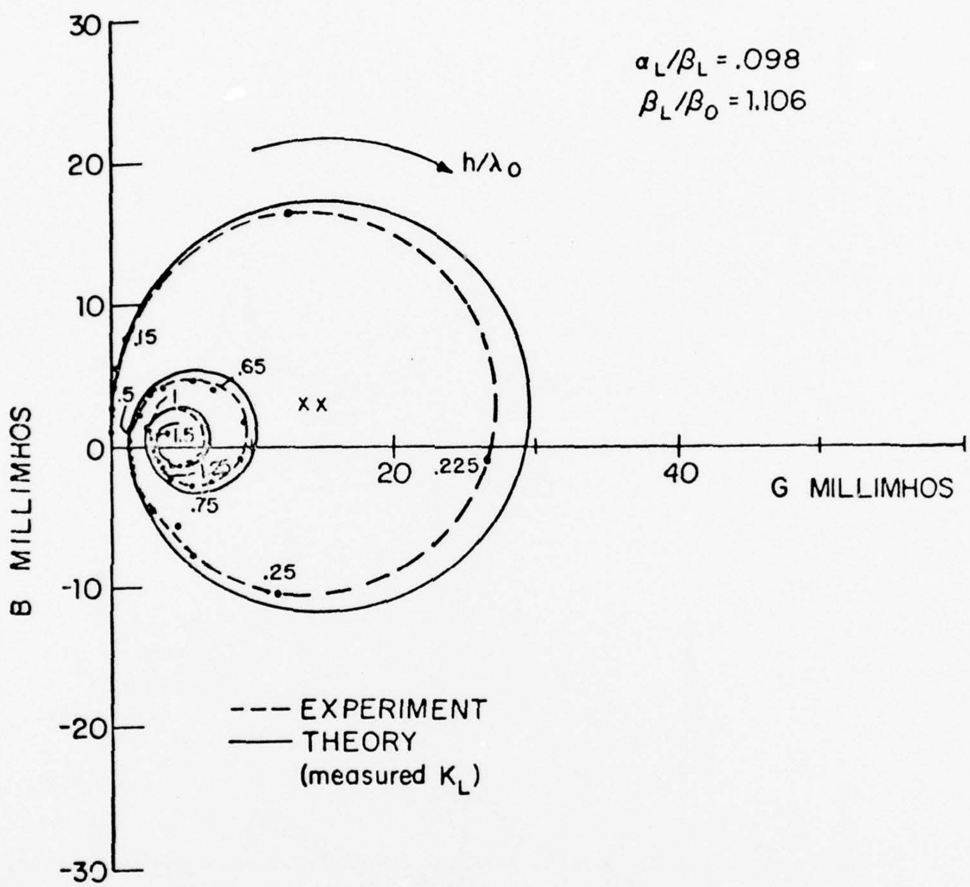


FIG. 3.75. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURE K_L; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$

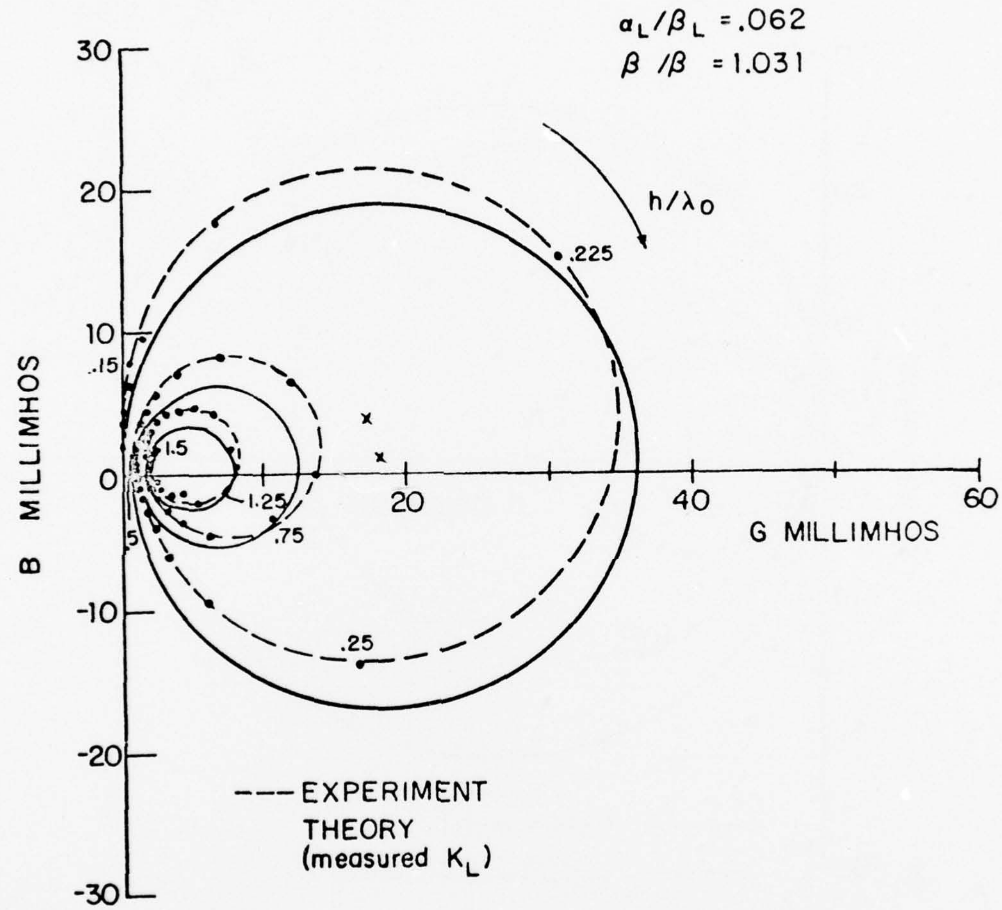


FIG. 3.76. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURE K_L; d/λ_0 = .05 AND a/λ_0 = .0015

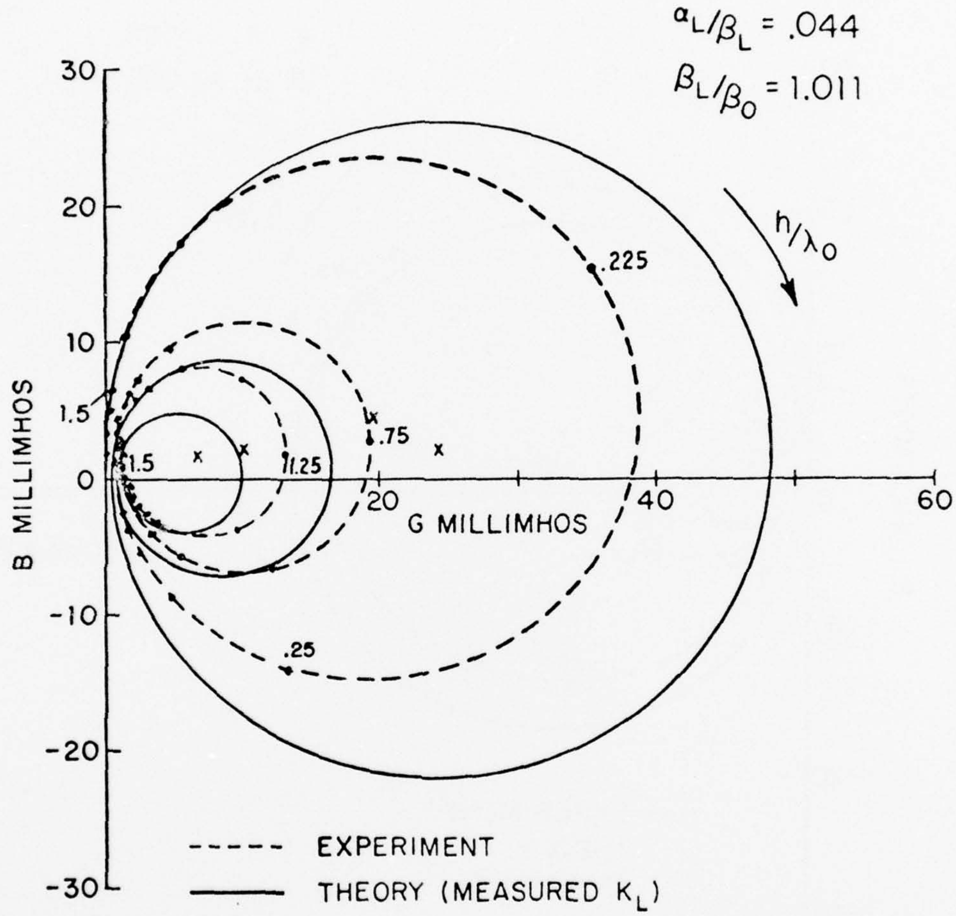


FIG. 3.77. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$.

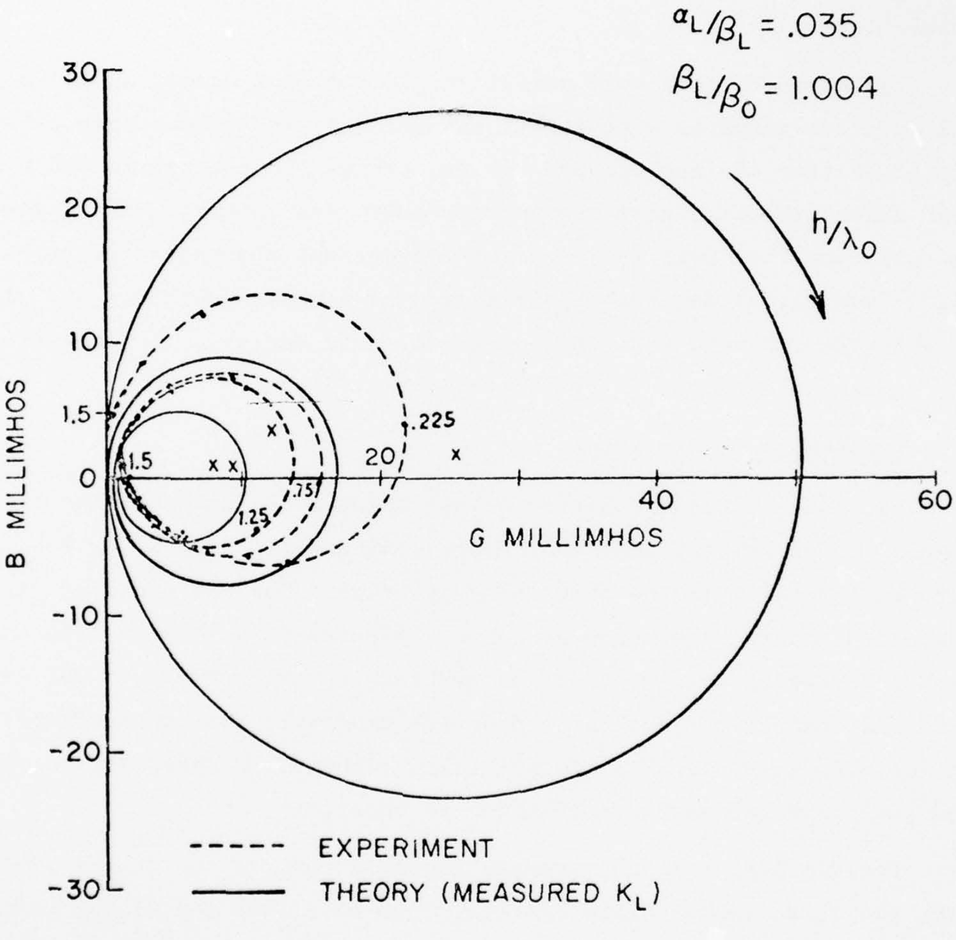


FIG. 3.78. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L; $d/\lambda_0 = .29$ AND $a/\lambda_0 = .0015$.

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THE BEVERAGE WAVE ANTENNA: CURRENTS, CHARGES AND ADMITTANCES VO--ETC(U)
FEB 77 R M SORBELLO F19628-76-C-0057
UNCLASSIFIED SCIENTIFIC-1 RADC-TR-77-82-VOL-2 NL

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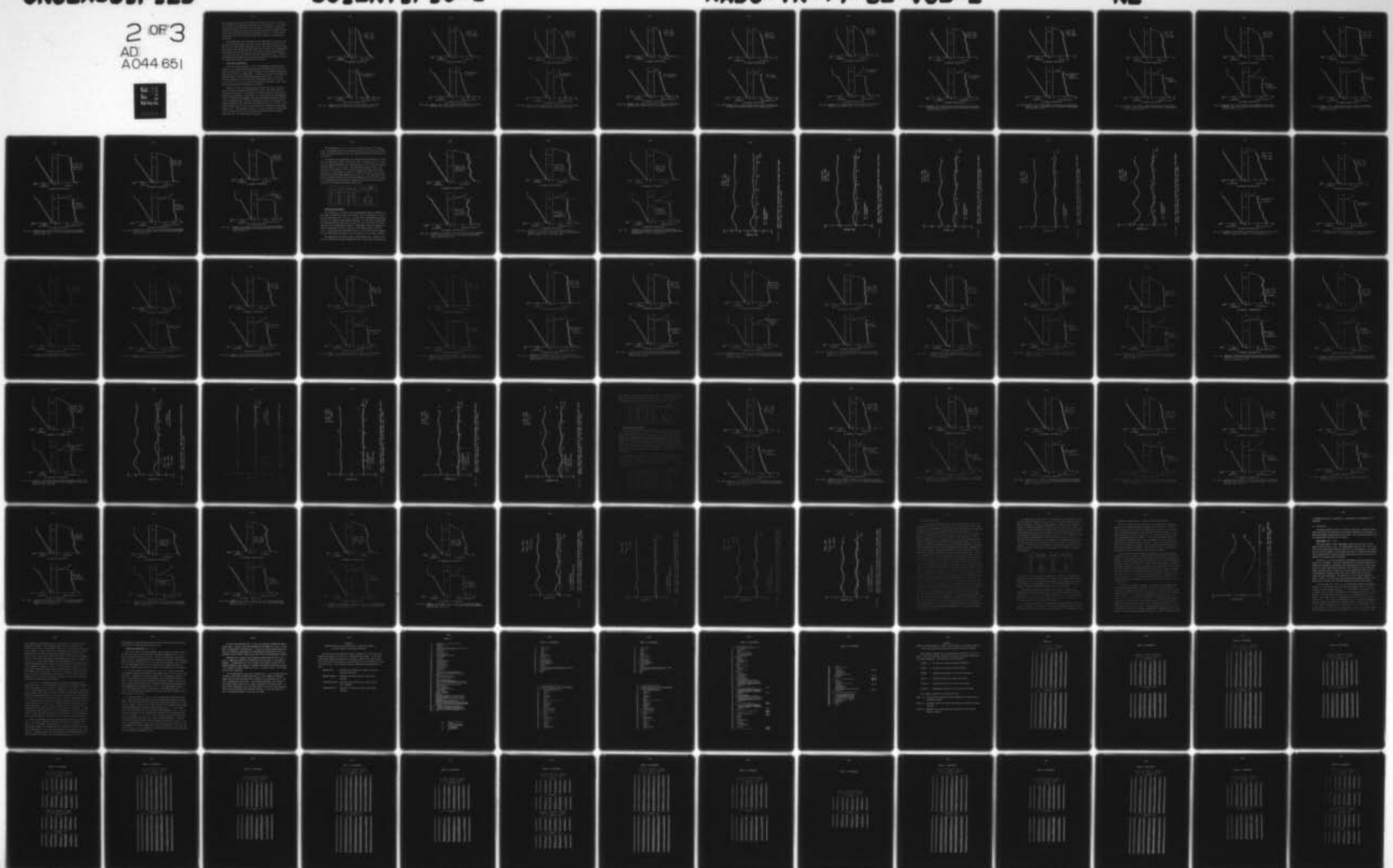


were connected along with the quarter-wave section to the end of the line and the VSWR on the antenna was measured with the charge probe. The resistor that gave the lowest VSWR was the one used. The amount of guess work involved in choosing the correct resistor was minimized by knowing the theoretical value for the characteristic impedance, Eq. (1.8). In most cases the resistor used was the one whose value came closest to the theoretical prediction.

The measured data were normalized in the same manner as in Section 3.3. All data are compared with either theoretical predictions, given by (1.54) and (1.56) for the current and charge, or for those cases in which the measured effective and theoretical wave numbers are in error with a semi-empirical solution that uses the form for the current and charge distributions in (1.54) and (1.56) and the measured effective wave number for k_L. Although no measurements were made on the quarter-wave section, the analytic form for the current and charge is presented in the figures.

Fresh-Water Measurements

With the critical quantity in all these measurements being the wave number, it is evident that the theoretical and measured effective wave numbers will agree over the same range of heights for the modified Beverage antenna case as for the unloaded cases. Figures 3.79 through 3.84 compare the measured results for the modified Beverage antenna at d/λ_0 = .01 and .02 with the theoretical current and charge expressions given in (1.54) and (1.56) with (1.7) for k_L. In all these figures the agreement is very good and the traveling-wave distribution is apparent.

Figures 3.85 and 3.89 compare measured results for d/λ_0 = .05 and .1 with the current and charge distributions in (1.54) and (1.56) using the theoretical wave number. The agreement in these two sets of curves is satisfactory even though the theoretical α_L is much smaller than the measured value. To improve the agreement, the same semi-empirical approach was used as in the monopole case. Figures 3.86 through 3.88 and 3.90 through 3.92 compare measured current and charge distributions for d/λ_0 = .05 and .1 with analytic expressions in (1.54) and (1.56) with the measured effective wave number for k_L. The agreement is seen to be quite good except for variations at the driving point and at the resistive load which cannot be properly taken care of by the zeroth-order expressions.

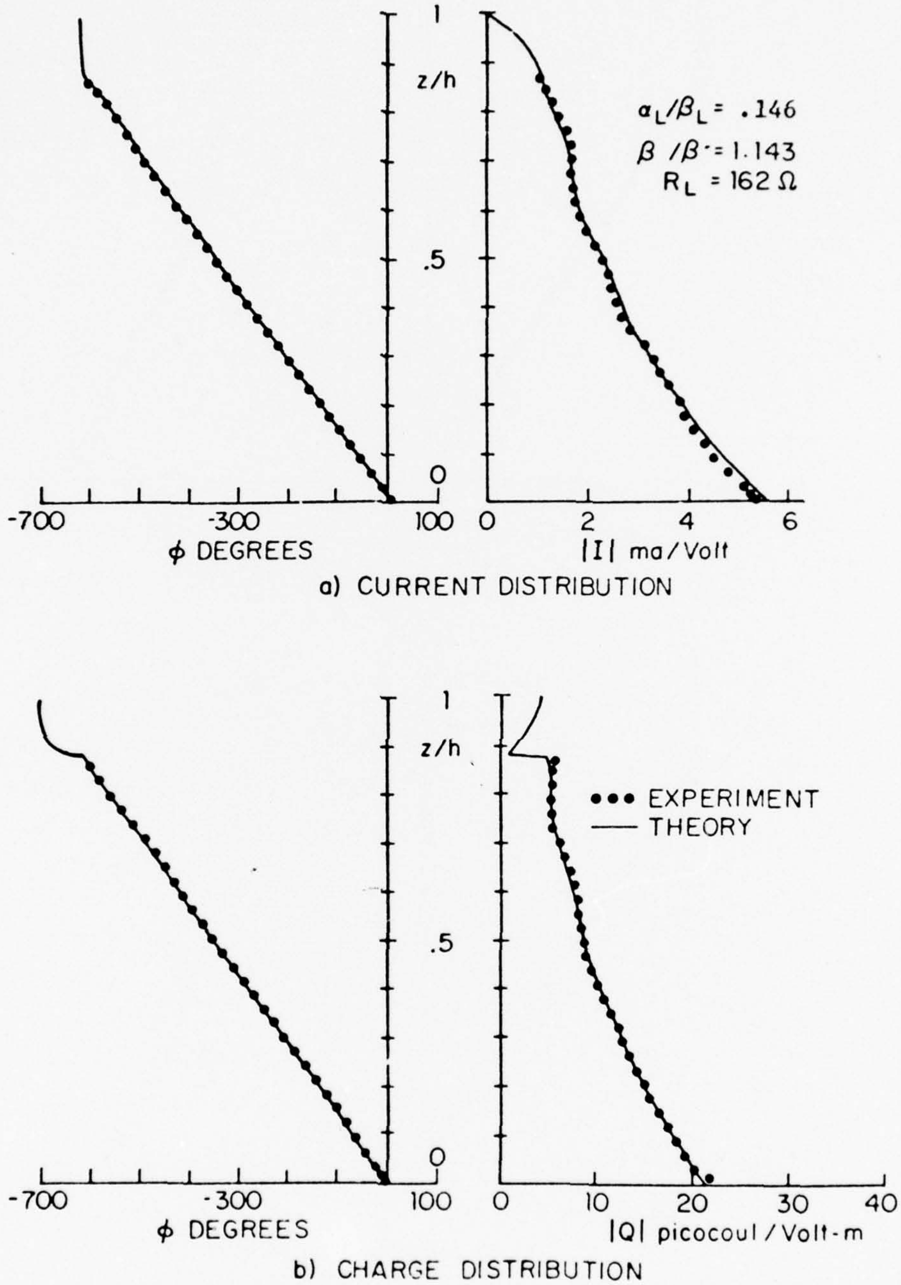
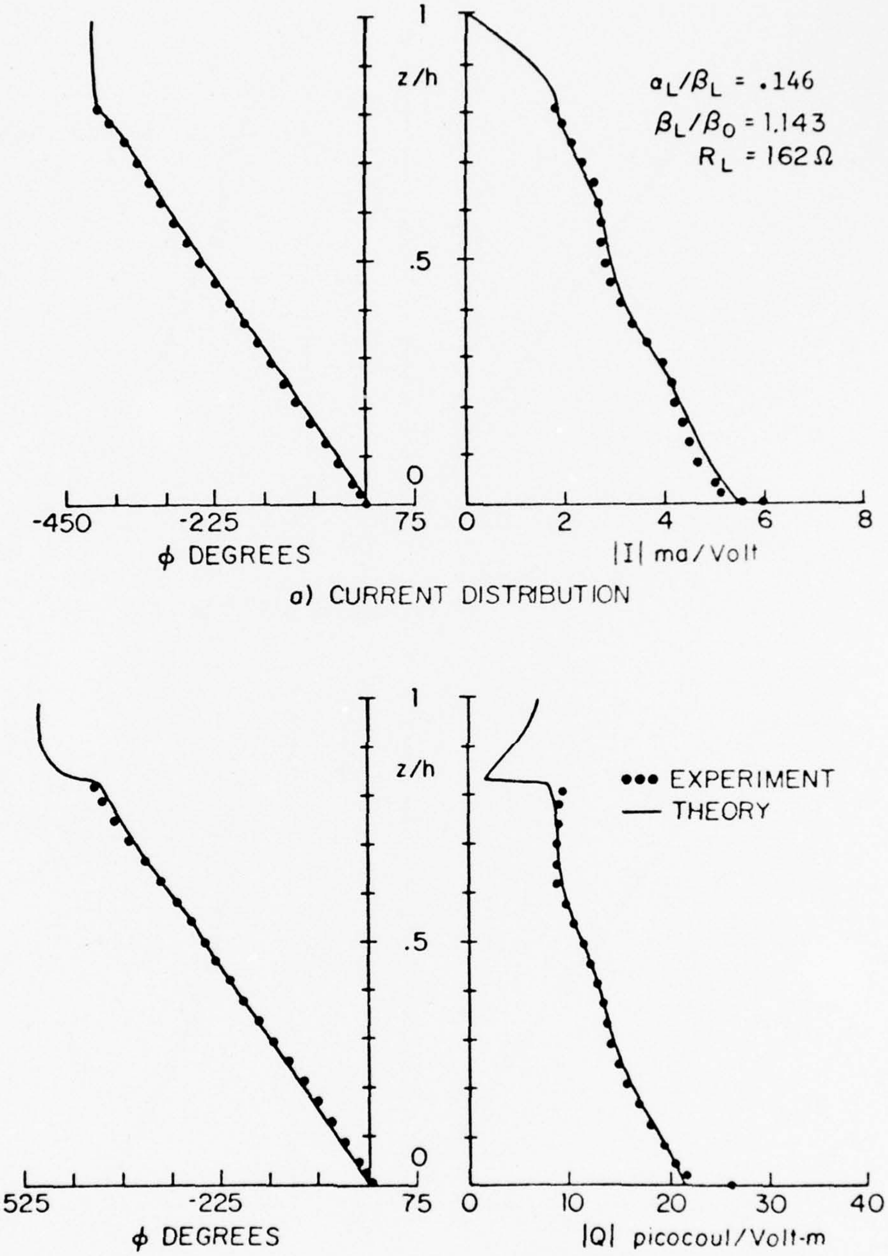


FIG. 3.79. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; ℓ_1/λ_σ=1.5 AND d/λ_0=.01.



a) CURRENT DISTRIBUTION

b) CHARGE DISTRIBUTION

FIG. 3.80. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

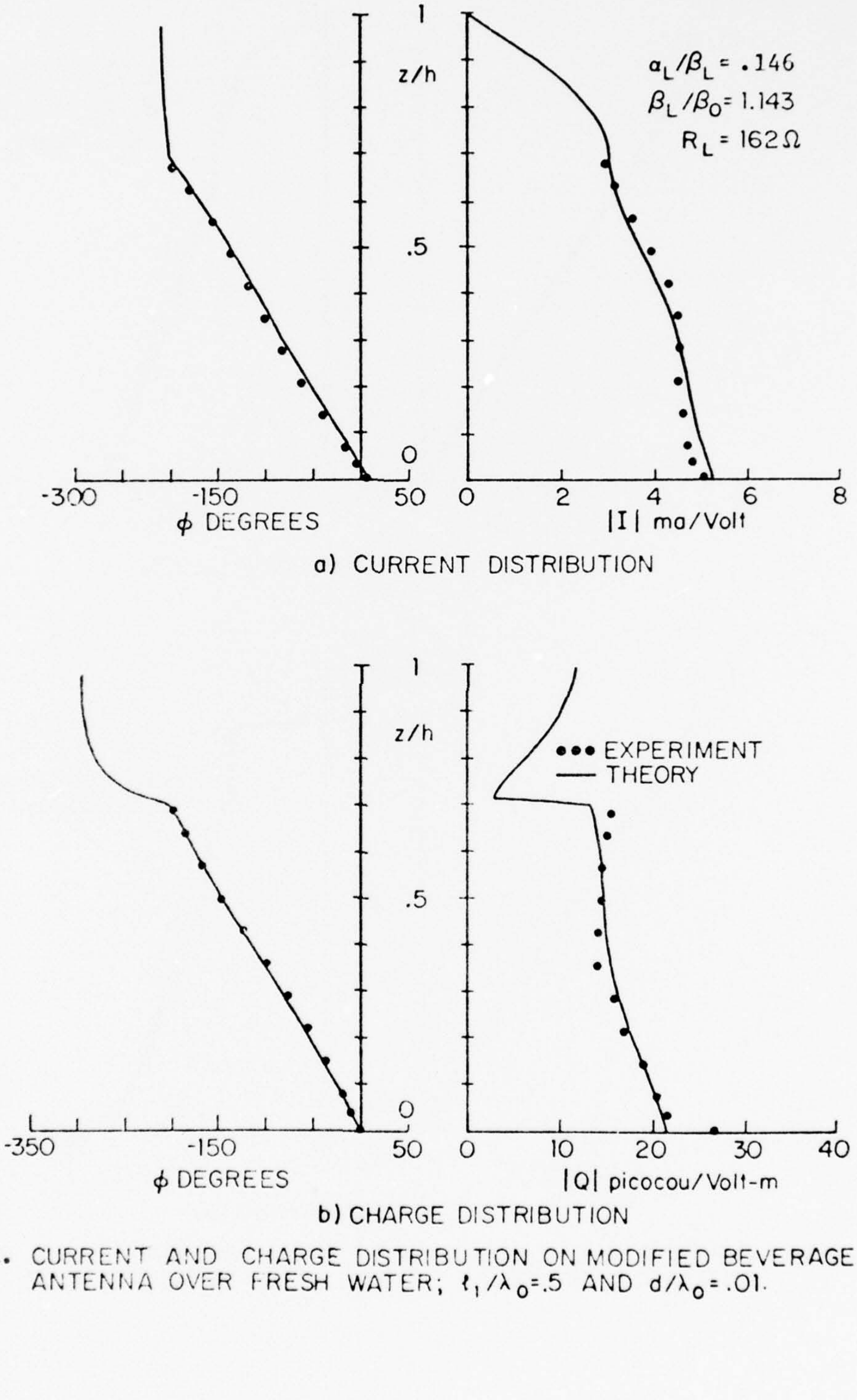


FIG. 3.81. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; ℓ_1/λ_0=.5 AND d/λ_0=.01.

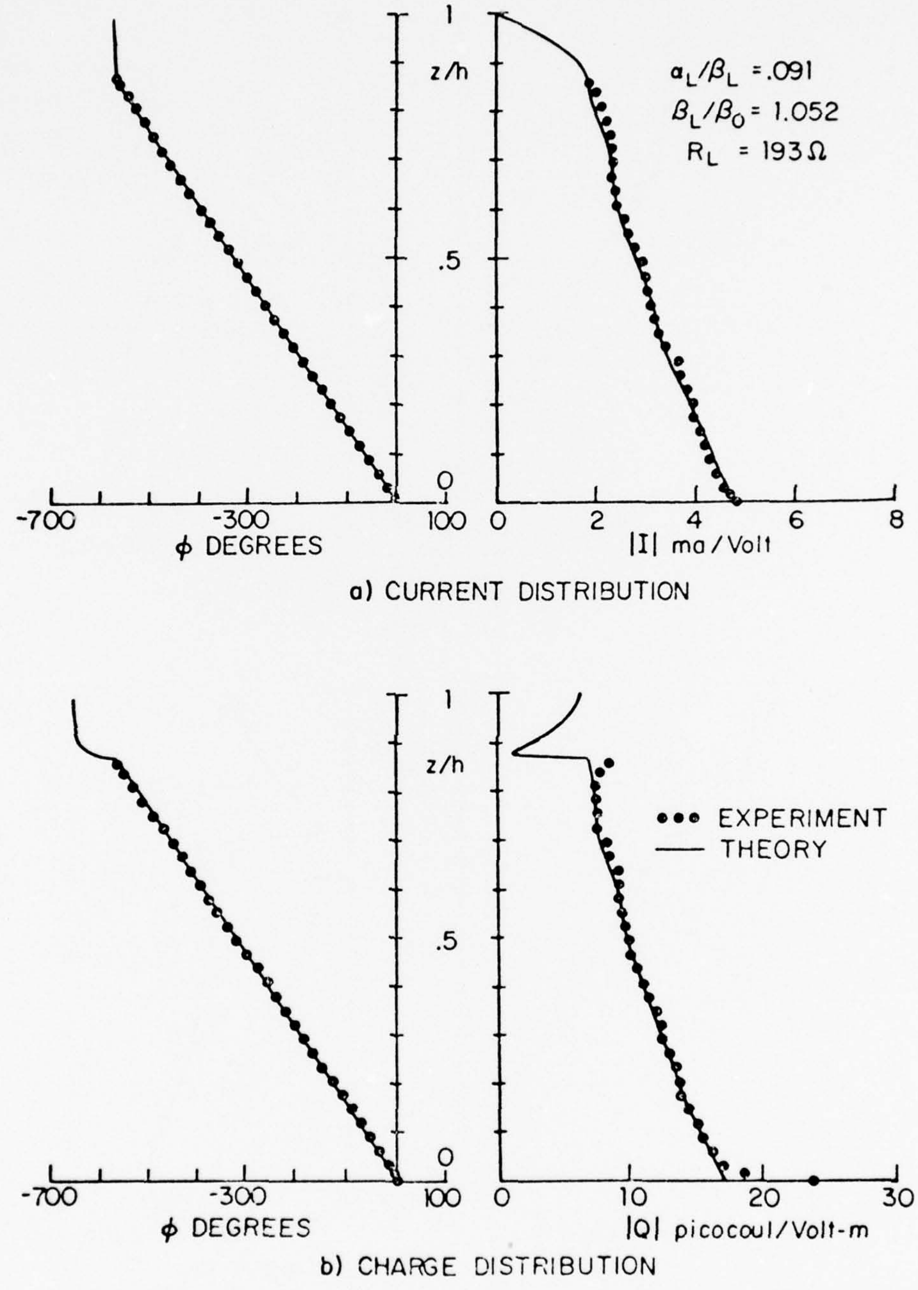


FIG. 3.82. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; ℓ_1/λ_0= 1.5 AND d/λ_0= .02.

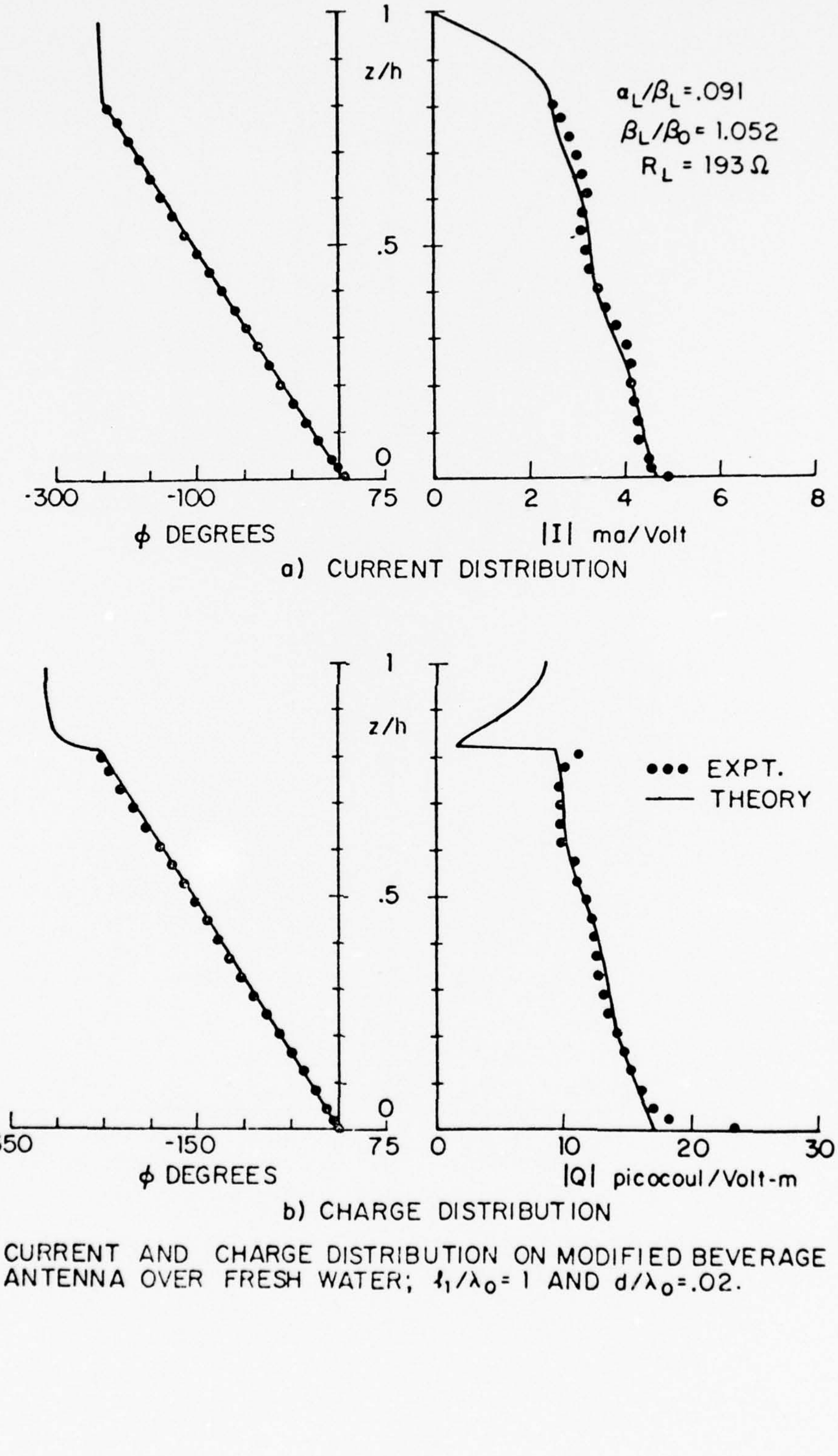


FIG. 3.83. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; ℓ_1/λ_0= 1 AND d/λ_0=.02.

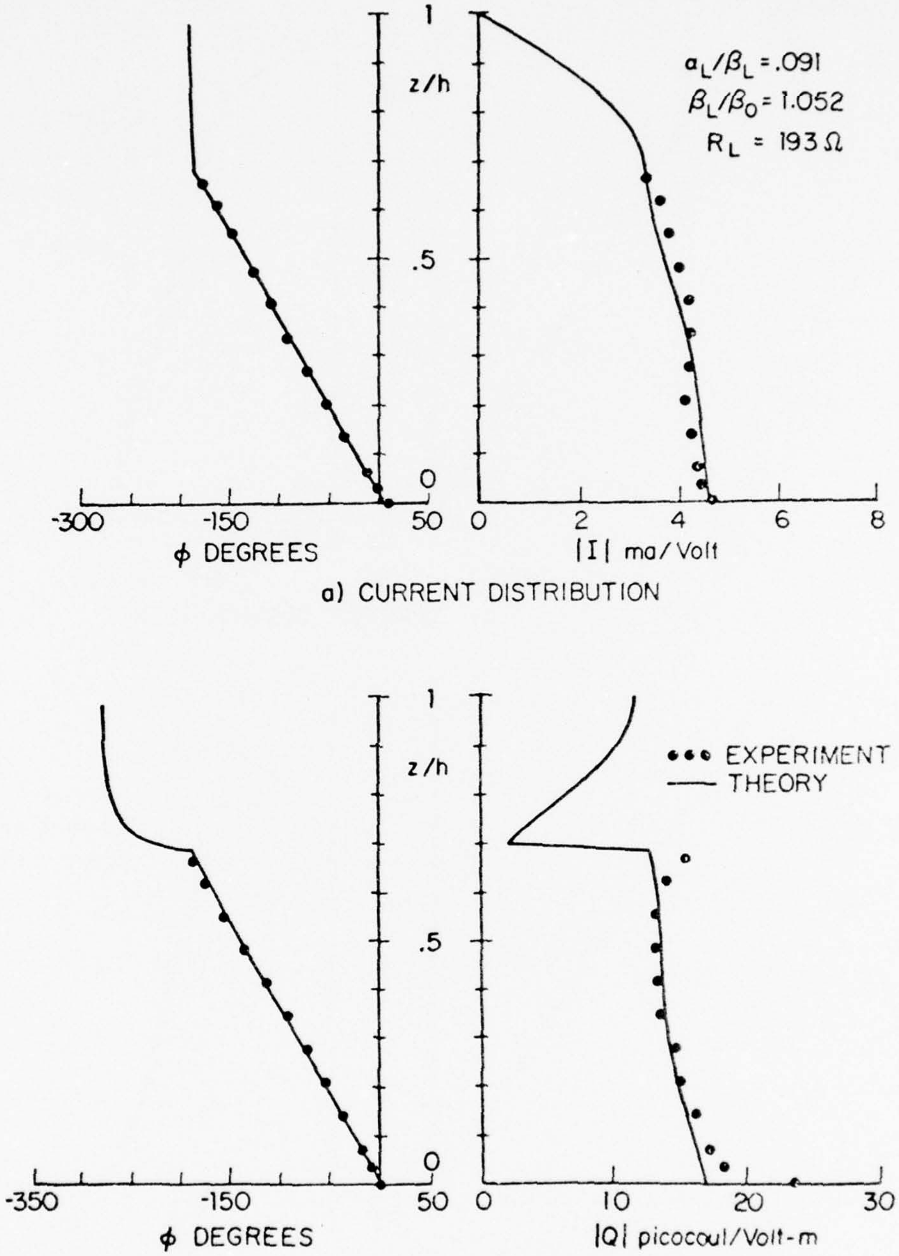
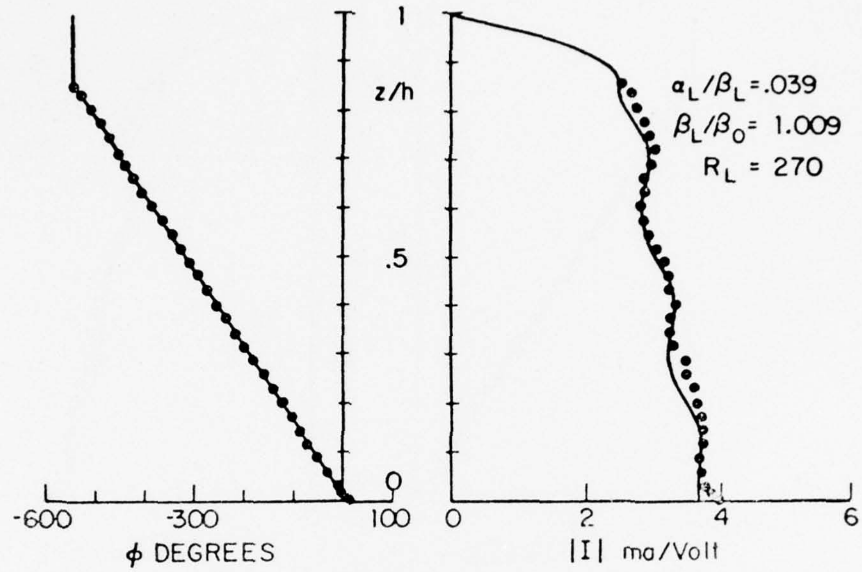
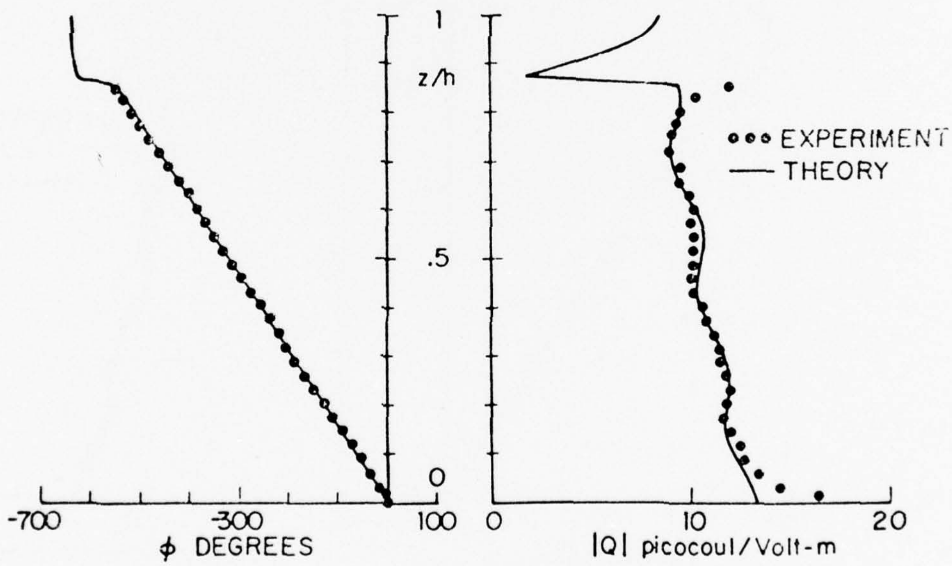


FIG. 3.84. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $\ell_1/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.85. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING THEORETICAL WAVENUMBER; ℓ_1/λ_0= 1.5 AND d/λ_0 =.05.

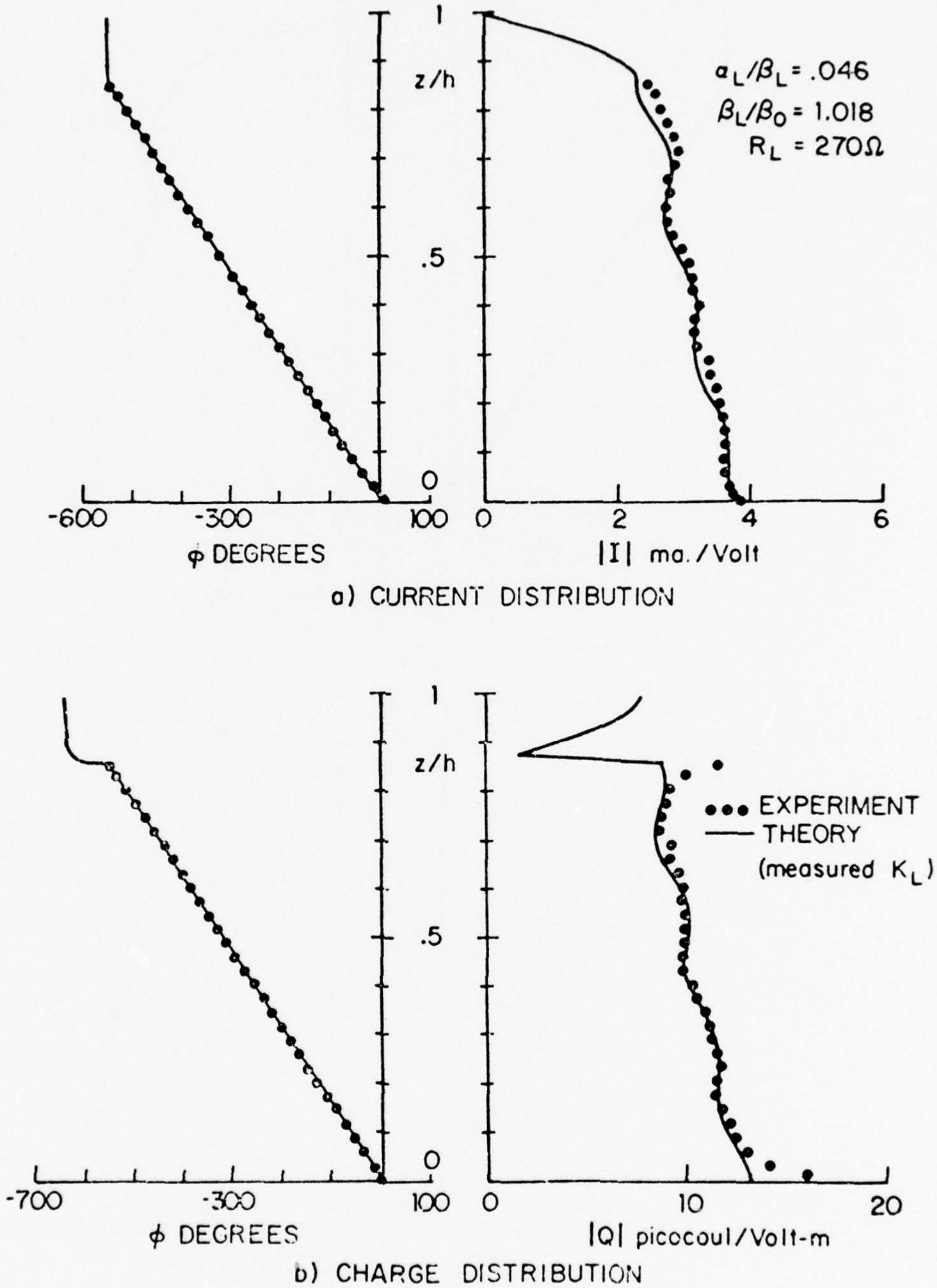
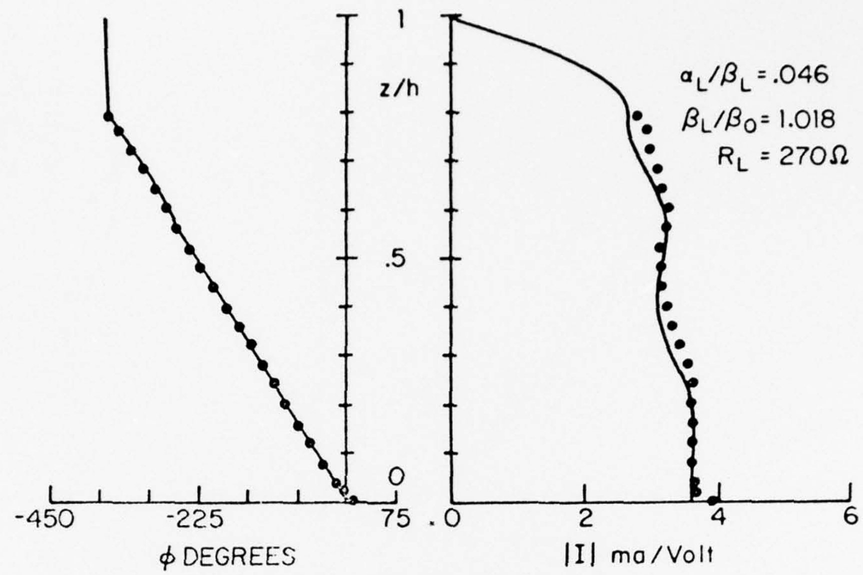
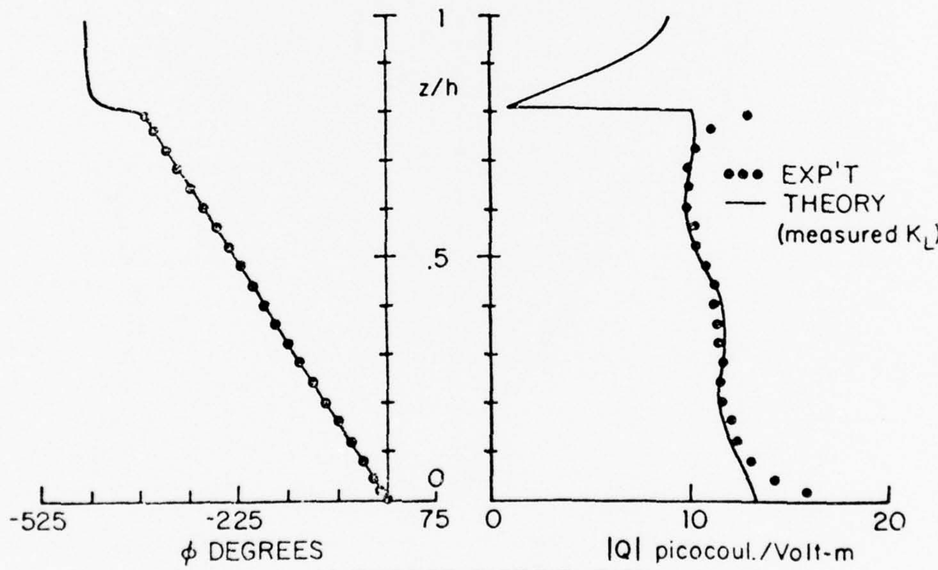


FIG. 3.86. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

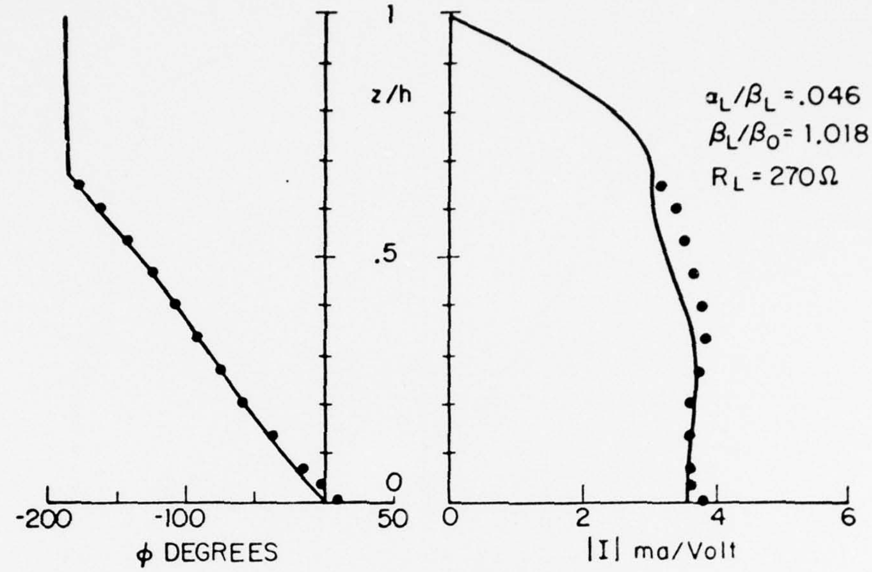


a) CURRENT DISTRIBUTION

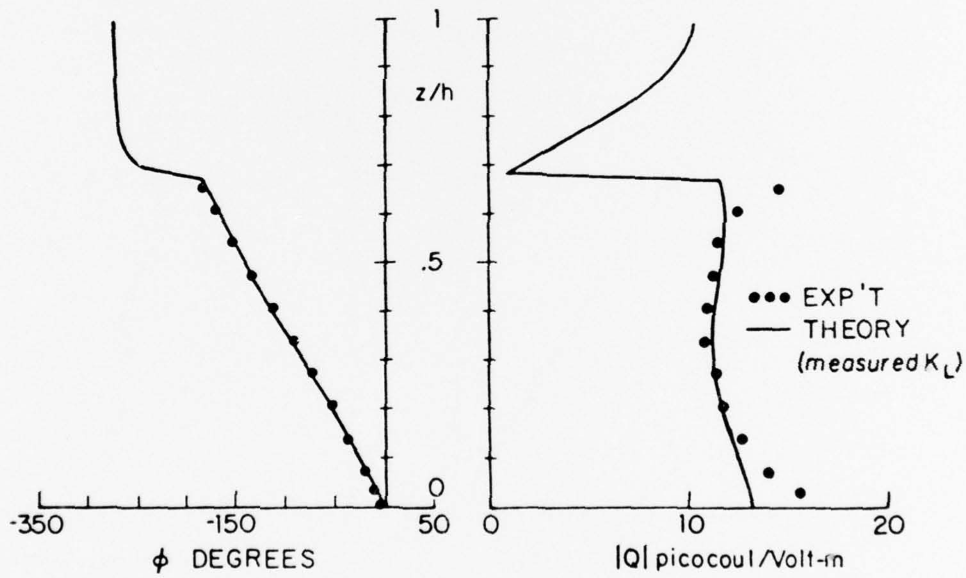


b) CHARGE DISTRIBUTION

FIG. 3.87. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.88 CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0=.5 AND d/λ =.05

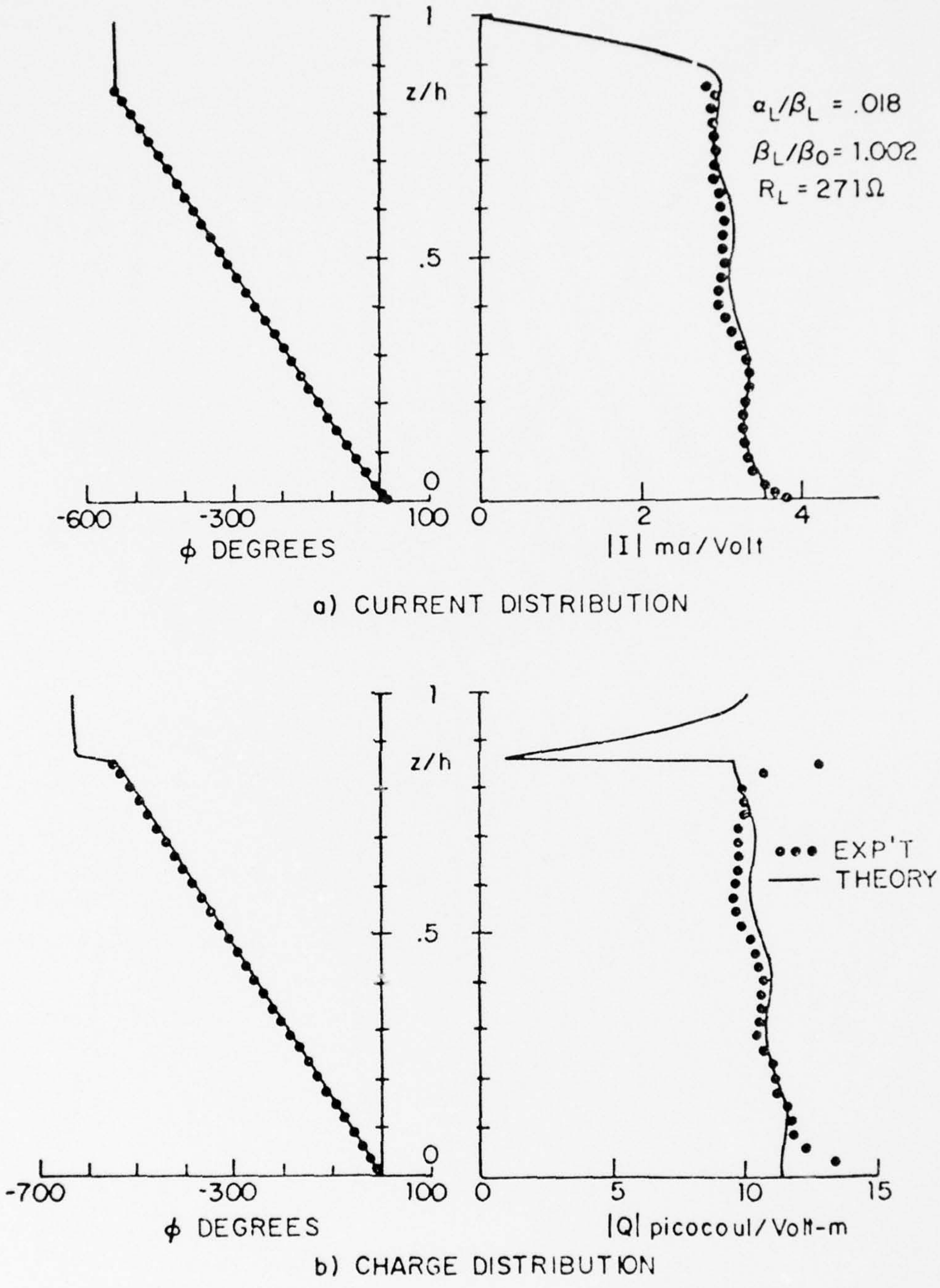


FIG. 3.89. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING THEORETICAL WAVENUMBER ℓ_1/λ_0 =1.5 AND d/λ_0=.1.

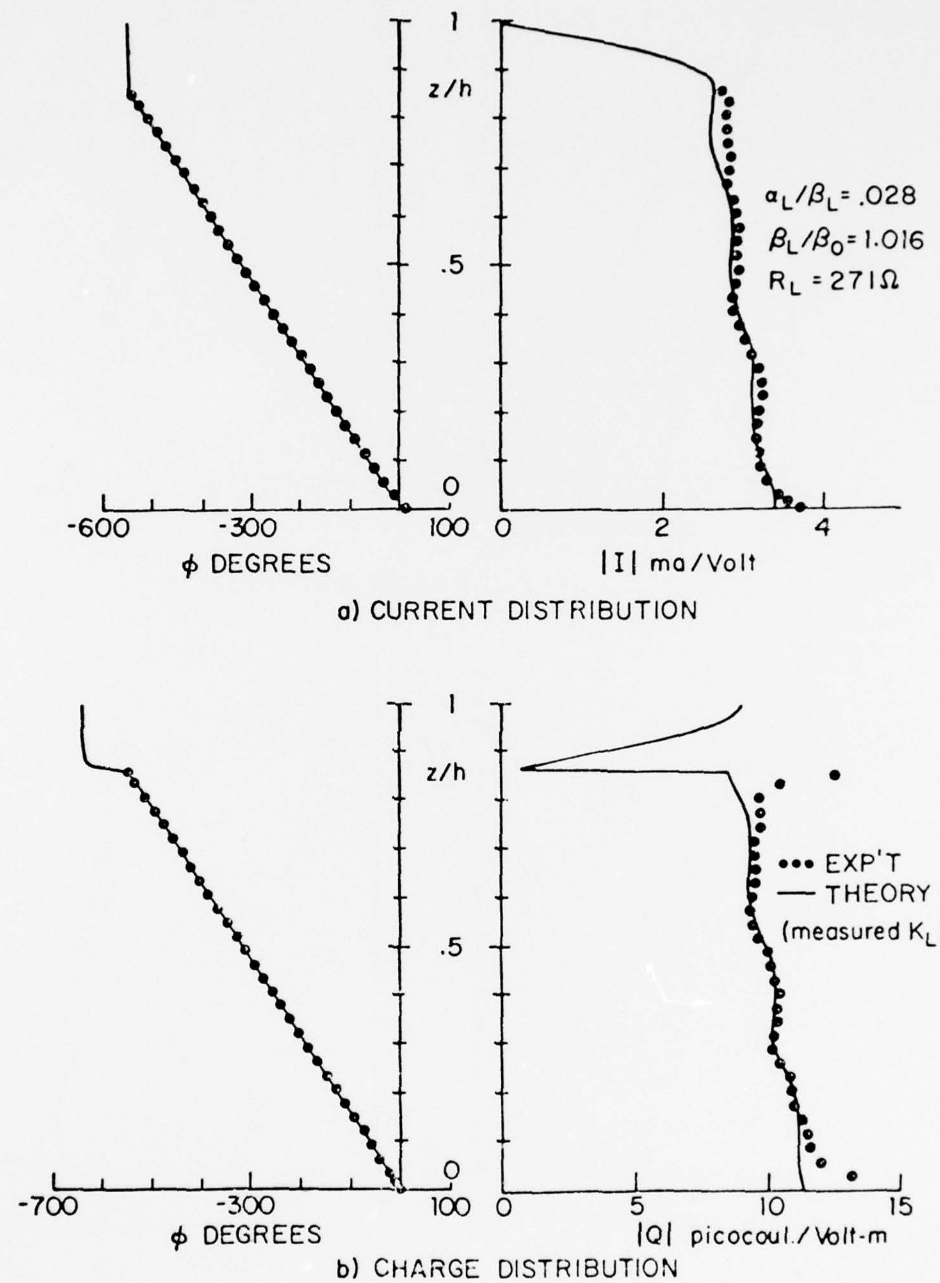


FIG. 3.90. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.

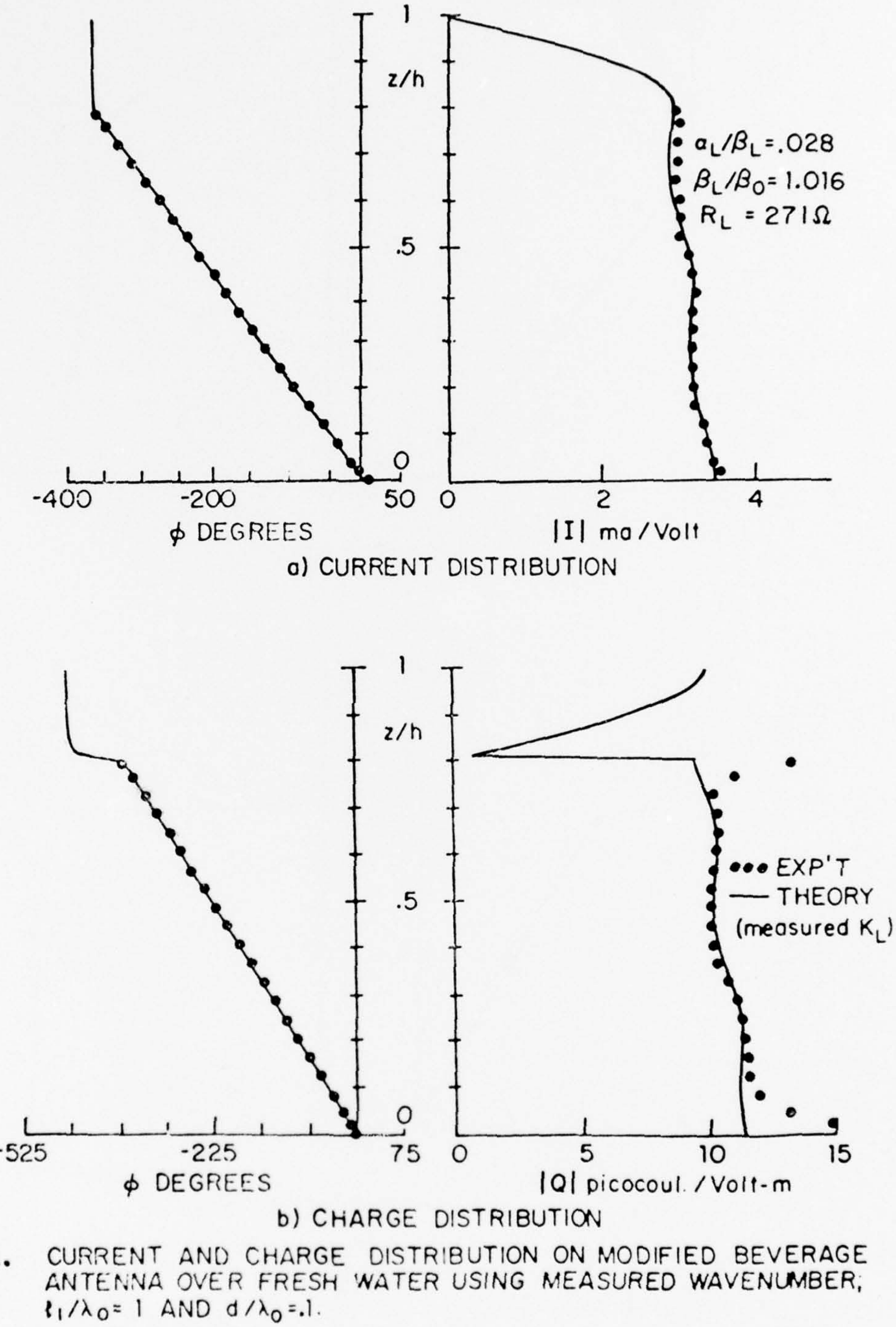


FIG. 3.91. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0= 1 AND d/λ_0=.1.

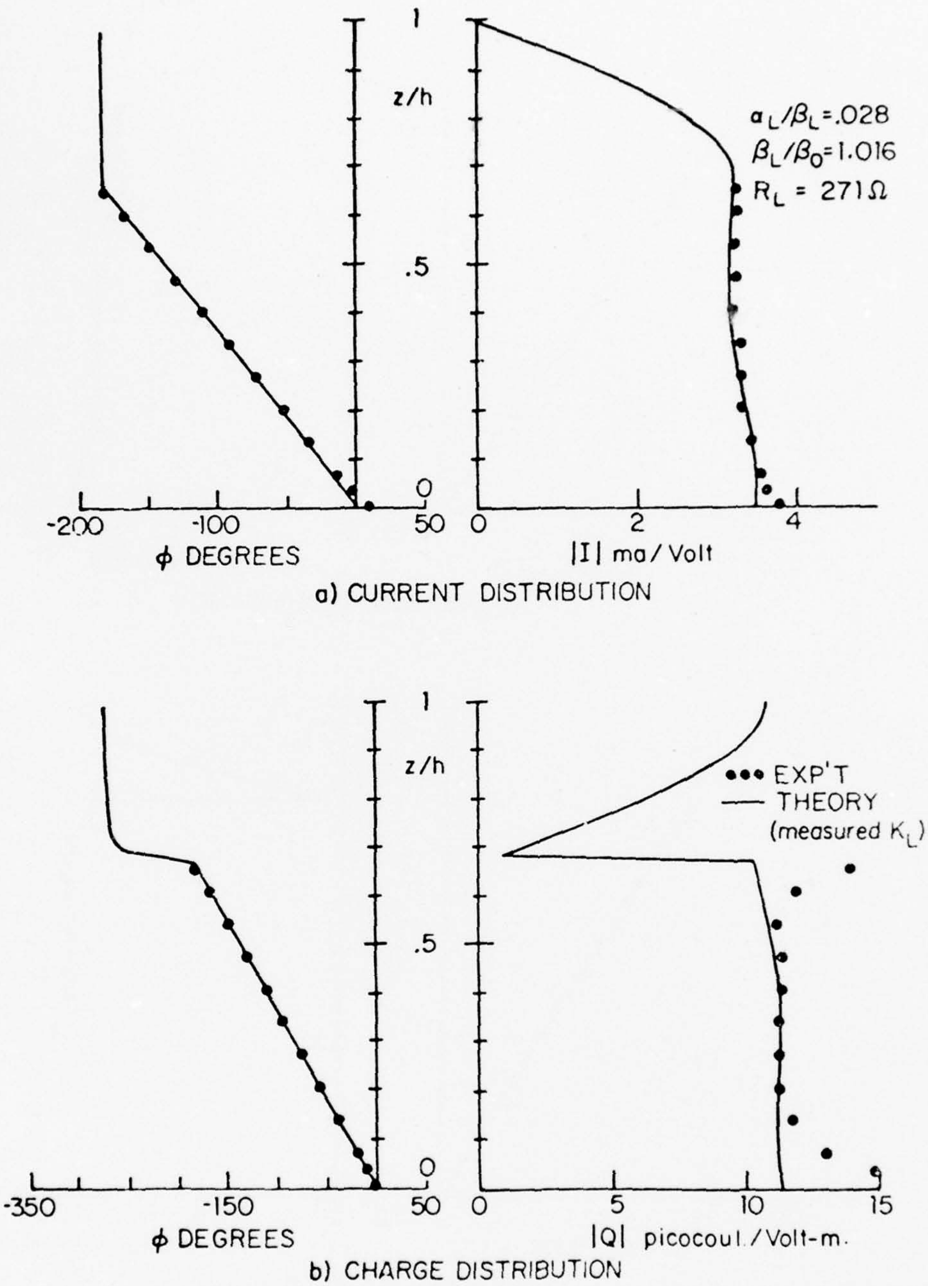


FIG. 3.92. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0=.5 AND d/λ_0=.1.

The measurements for d/λ_0 = .25 are presented in Figs. 3.93 through 3.95. The agreement with the semi-empirical solution is fairly good considering the apparent departure from the transmission-line-like distribution at this height.

The measured input admittance for modified Beverage antennas over fresh water is presented in Figs. 3.96 through 3.100. Figures 3.96 and 3.97 compare the measured admittance with the expression in (1.55) using the theoretical wave number in (1.7) for k_L. The theoretical curves in Figs. 3.98, 3.99 and 3.100 consist of (1.55) with the measured effective wave number used for k_L. The agreement is good for a zeroth-order theory in all cases except for some noticeable departure for d/λ_0 = .25. The chart below lists the load resistor used for each height and compares each with half the value of the corresponding characteristic impedance predicted by King and calculated from the measured wave number using (1.8).

d/λ_0	R_L used	$(1/2)Z_c$ King	$(1/2)Z_c$ from measured k_L
.01	162 Ω	177 - j26 Ω	---
.02	193 Ω	207 - j20 Ω	---
.05	270 Ω	254 - j10 Ω	256 - j12 Ω
.1	271 Ω	294 - j5 Ω	298 - j8 Ω
.25	290 Ω	348 - j2 Ω	354 - j11 Ω

Salt-Water Measurements

The conclusions to be drawn from the measurements made on antennas over salt water, presented in Figs. 3.101 through 3.122, are analogous to those for the fresh-water case. At d/λ_0 = .01 and .02 the measurements agree very well with the complete theoretical expressions. For the other three heights the measured effective wave number is used for k_L in (1.54) and (1.56) and compared with the experimental results. Comparisons using the complete theoretical expressions for d/λ_0 = .05 and .1 are shown in Figs. 3.107 and 3.111. A good match can be obtained at d/λ_0 = .25 but the overall agreement with the semi-empirical solution is not as good as for the closer spacings.

The admittances are given in Figs. 3.118 through 3.122. Figures 3.118 and 3.119 compare the measured admittances with (1.55) using the theoretical

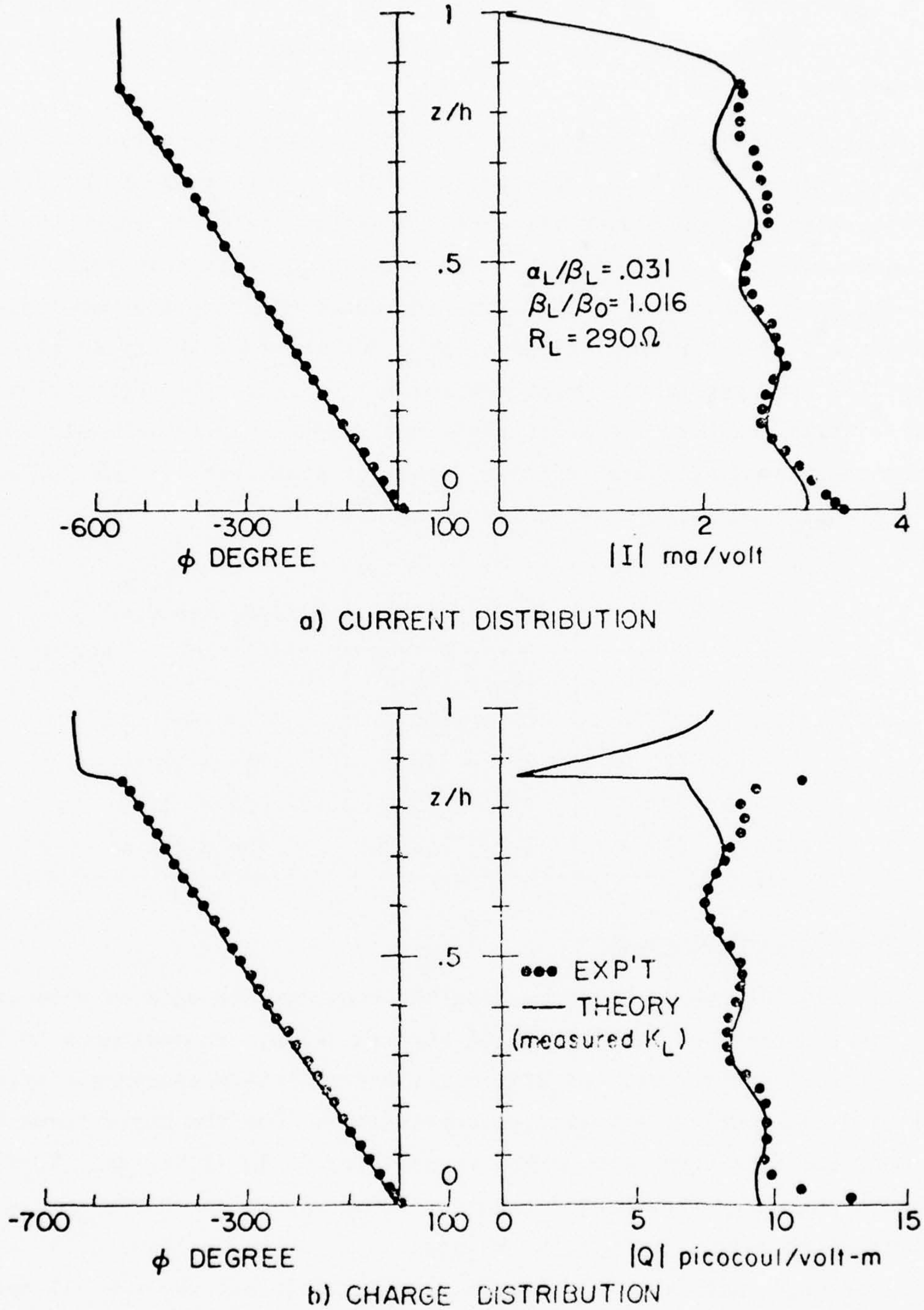


FIG. 3.93. CURRENT AND CHARGE ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0 = 1.5 AND d/λ_0 = .25.

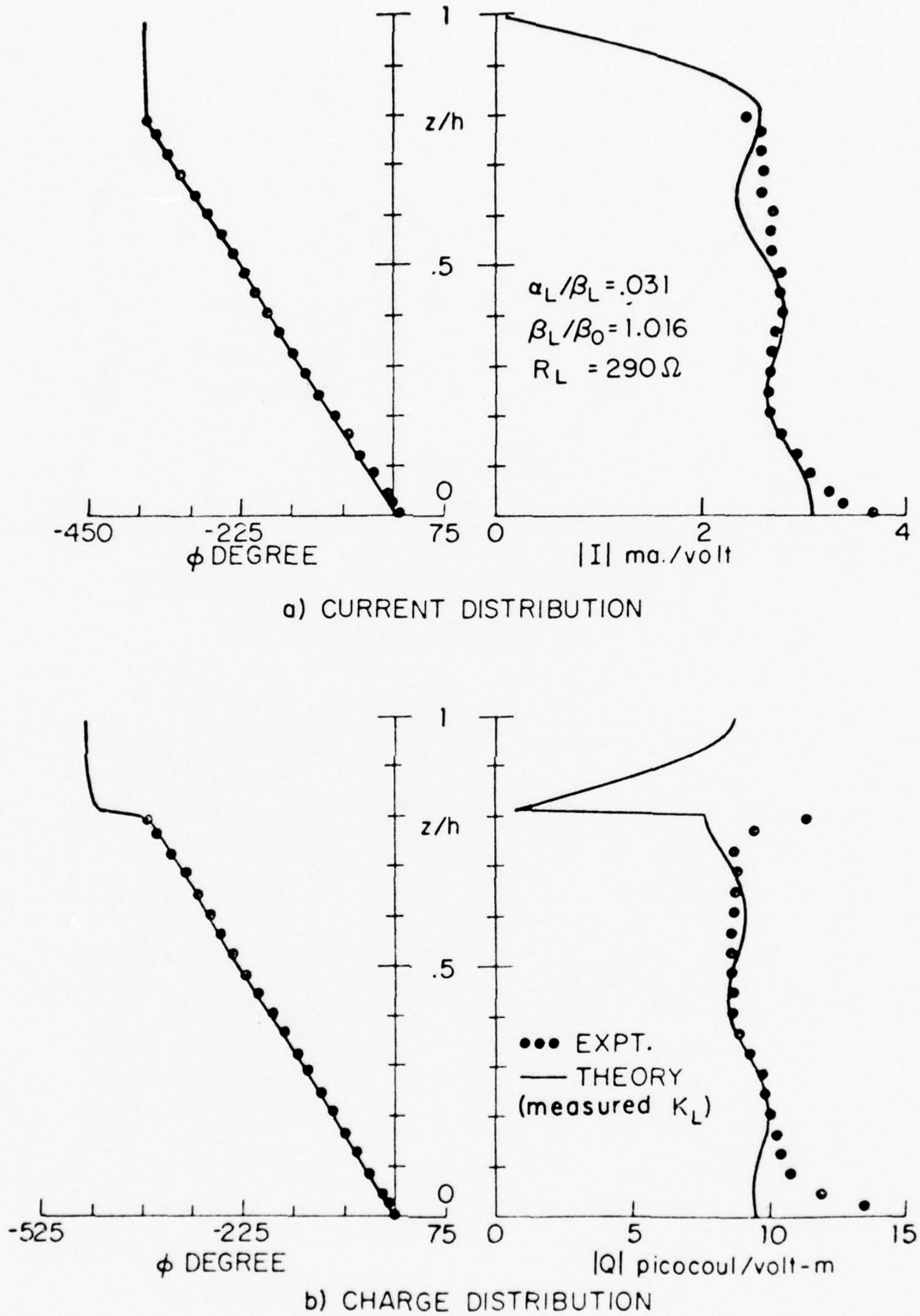
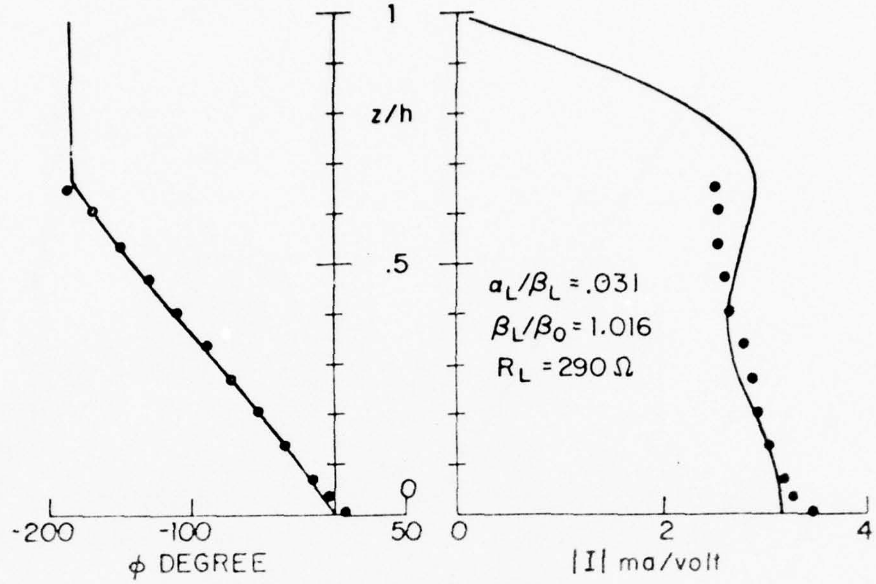
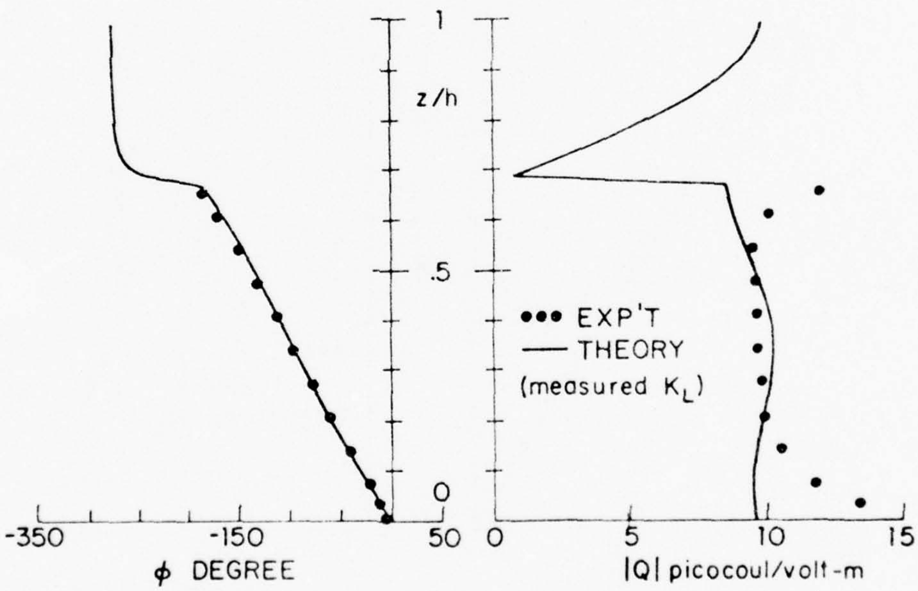


FIG. 3.94. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $\ell/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.95. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0=.5 AND d/λ_0=.25.

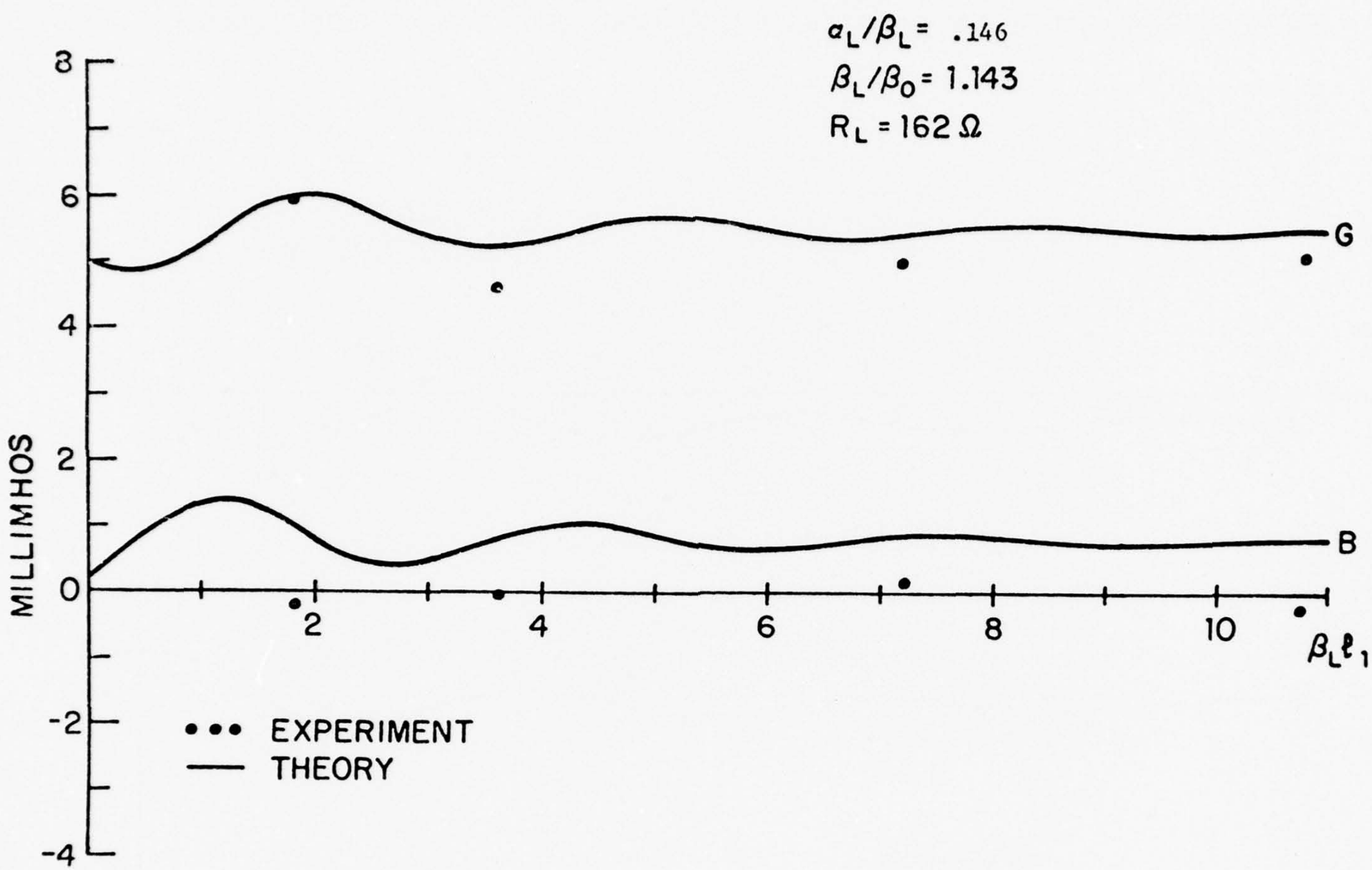


FIG. 3.96. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $d/\lambda_0 = .01$ AND $a/\lambda_0 = .0015$.

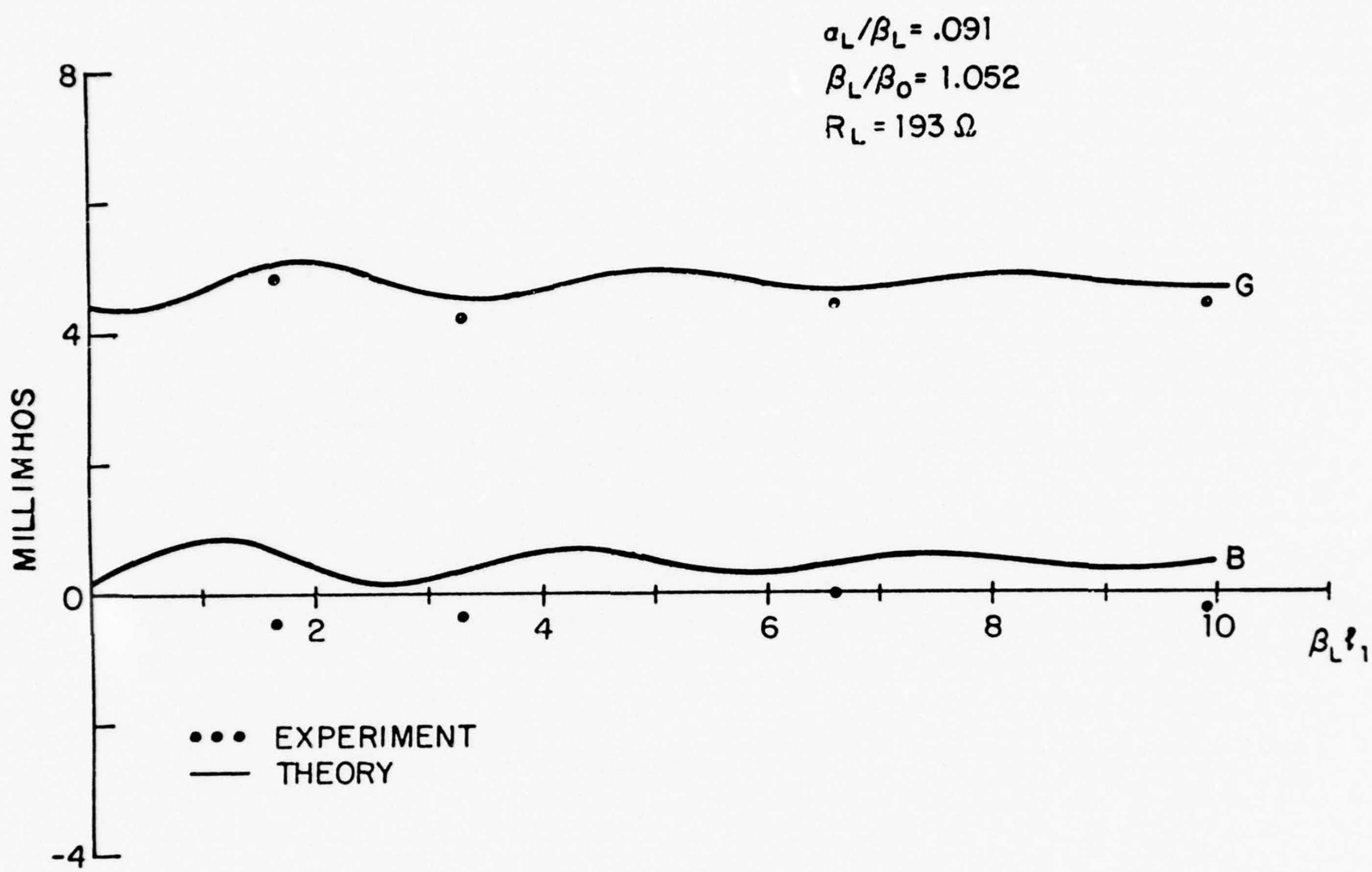


FIG. 3.97. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

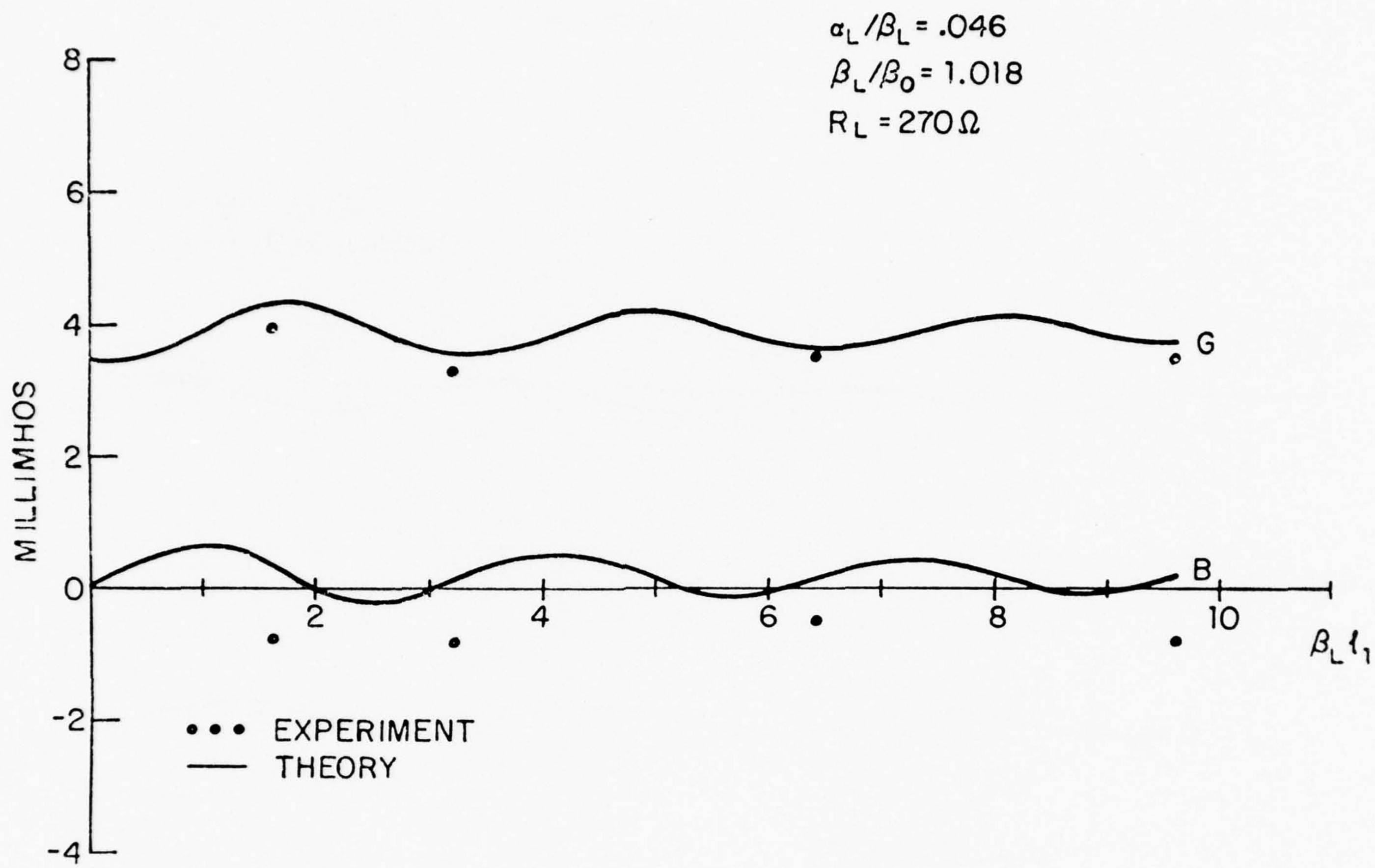


FIG. 3.98. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$

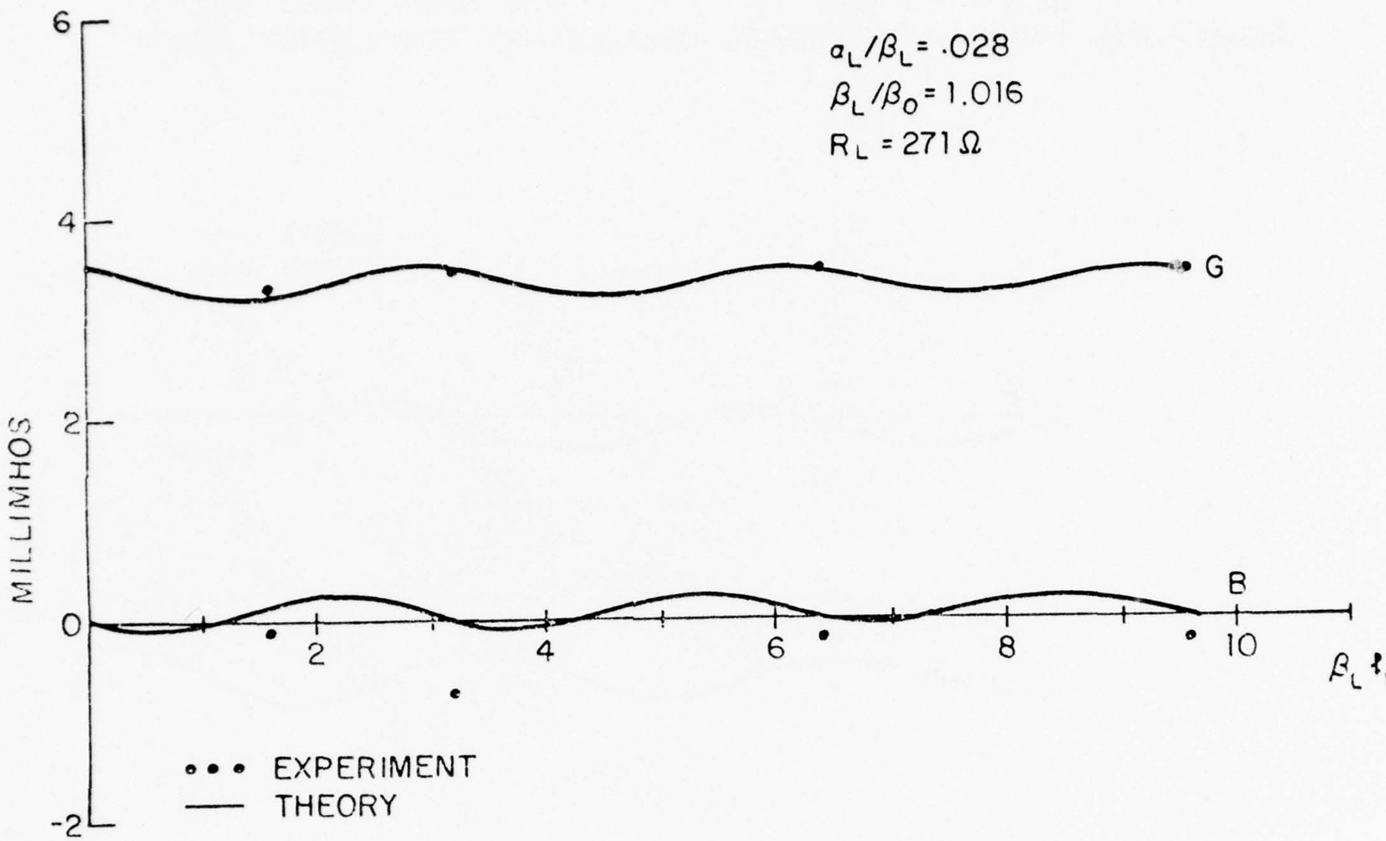


FIG. 3.99. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L; $d/\lambda_c = .1$ AND $a/\lambda_0 = .0015$

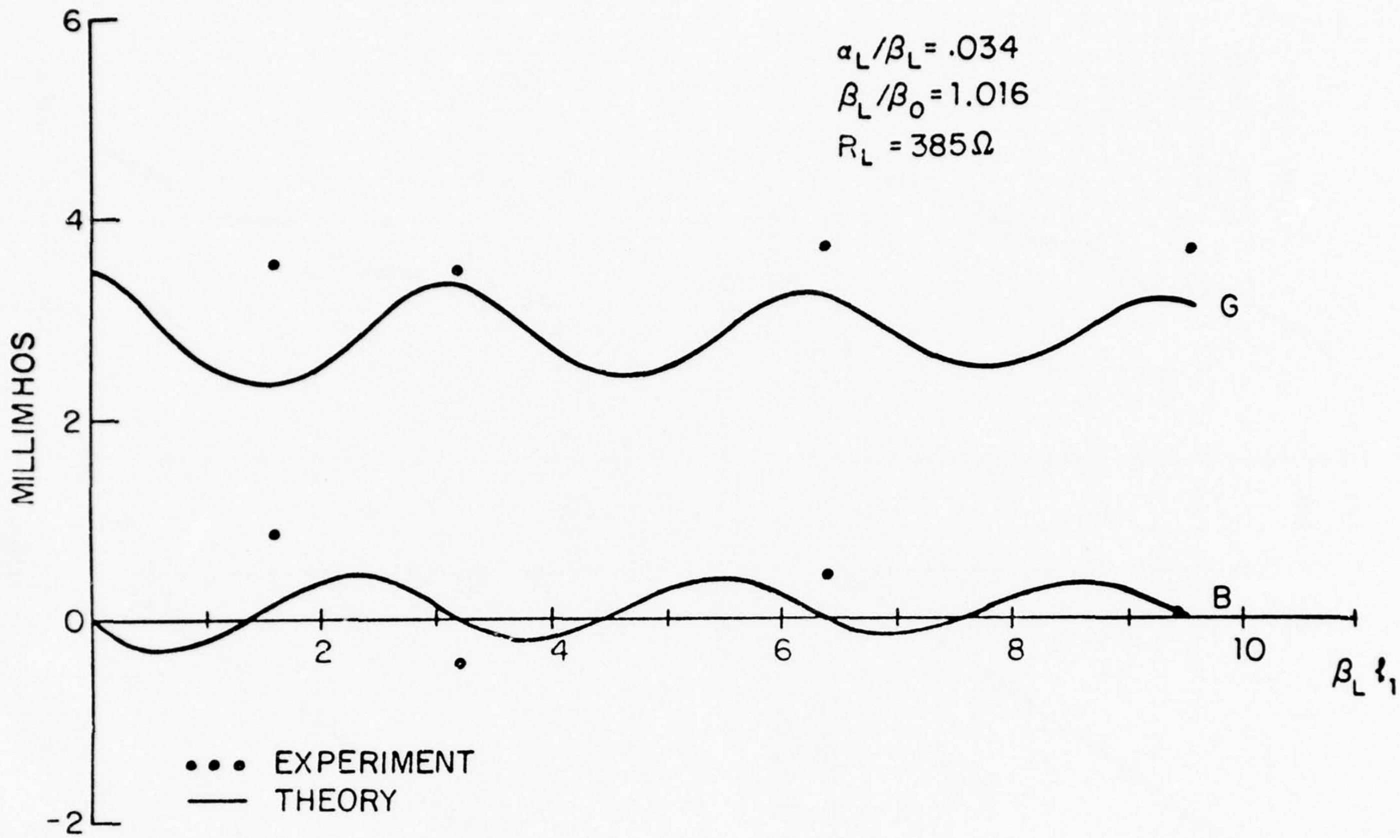


FIG. 3.100. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L; $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$

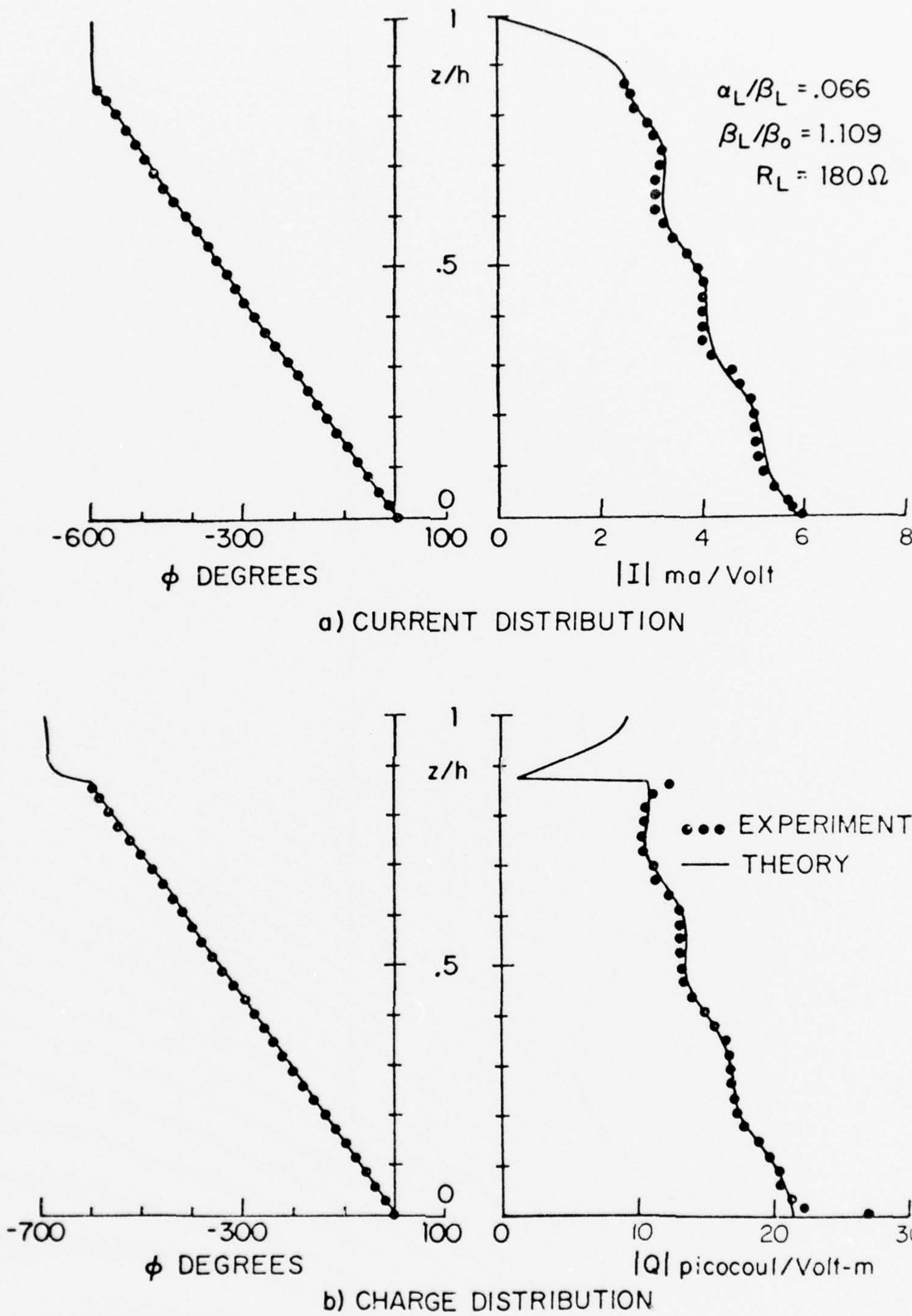


FIG. 3.101. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$.

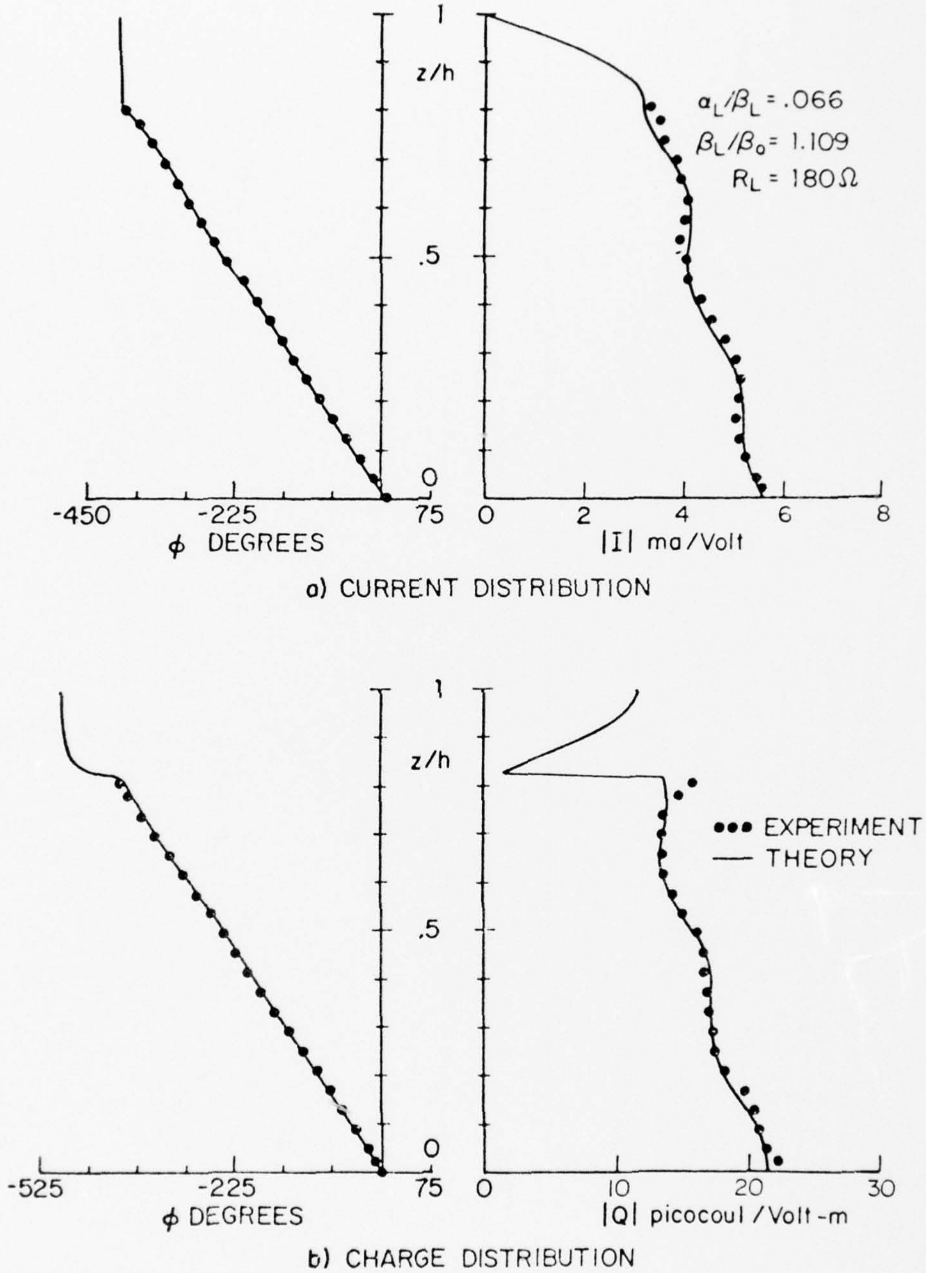


FIG. 3.102. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

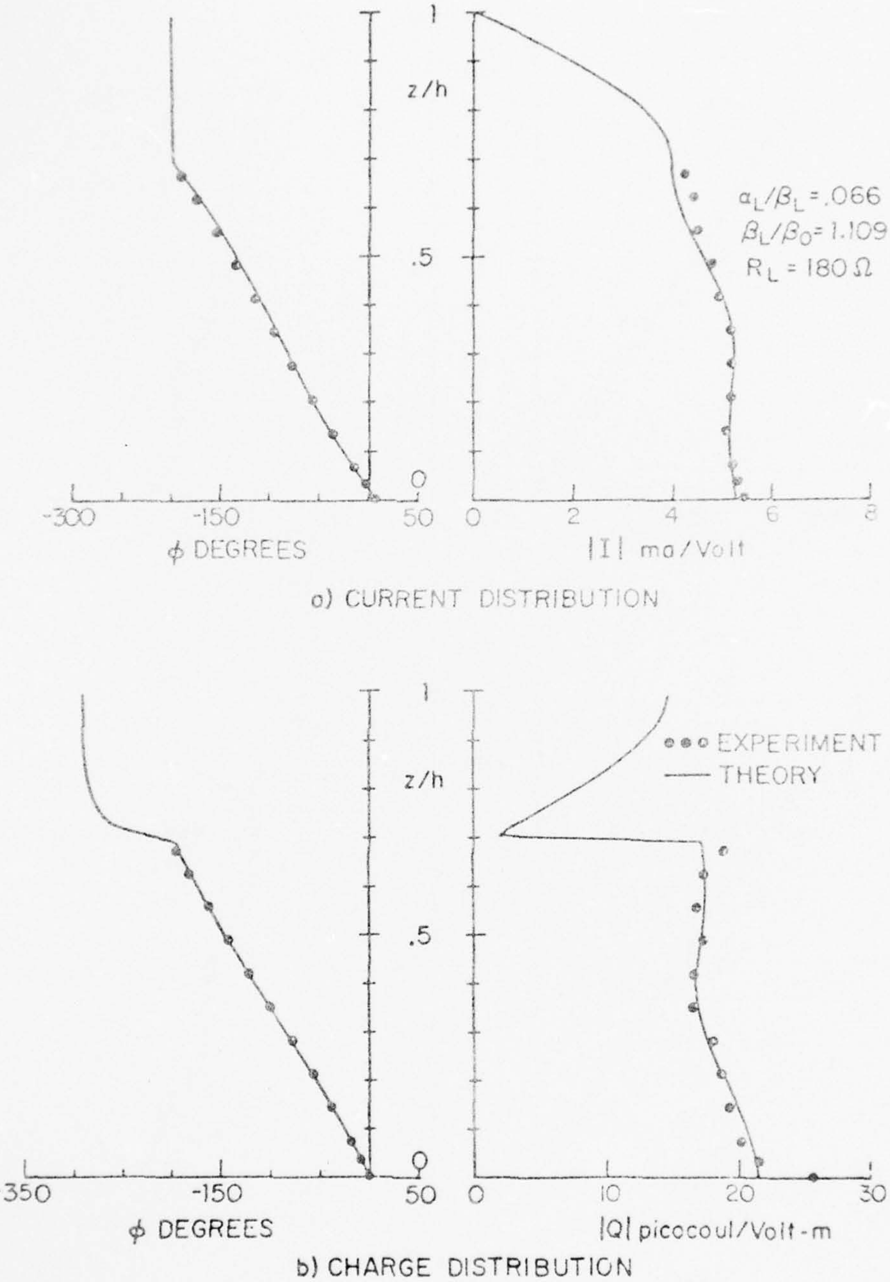


FIG. 3.103. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; ℓ_1/λ_0 = .5 AND d/λ_0 = .01.

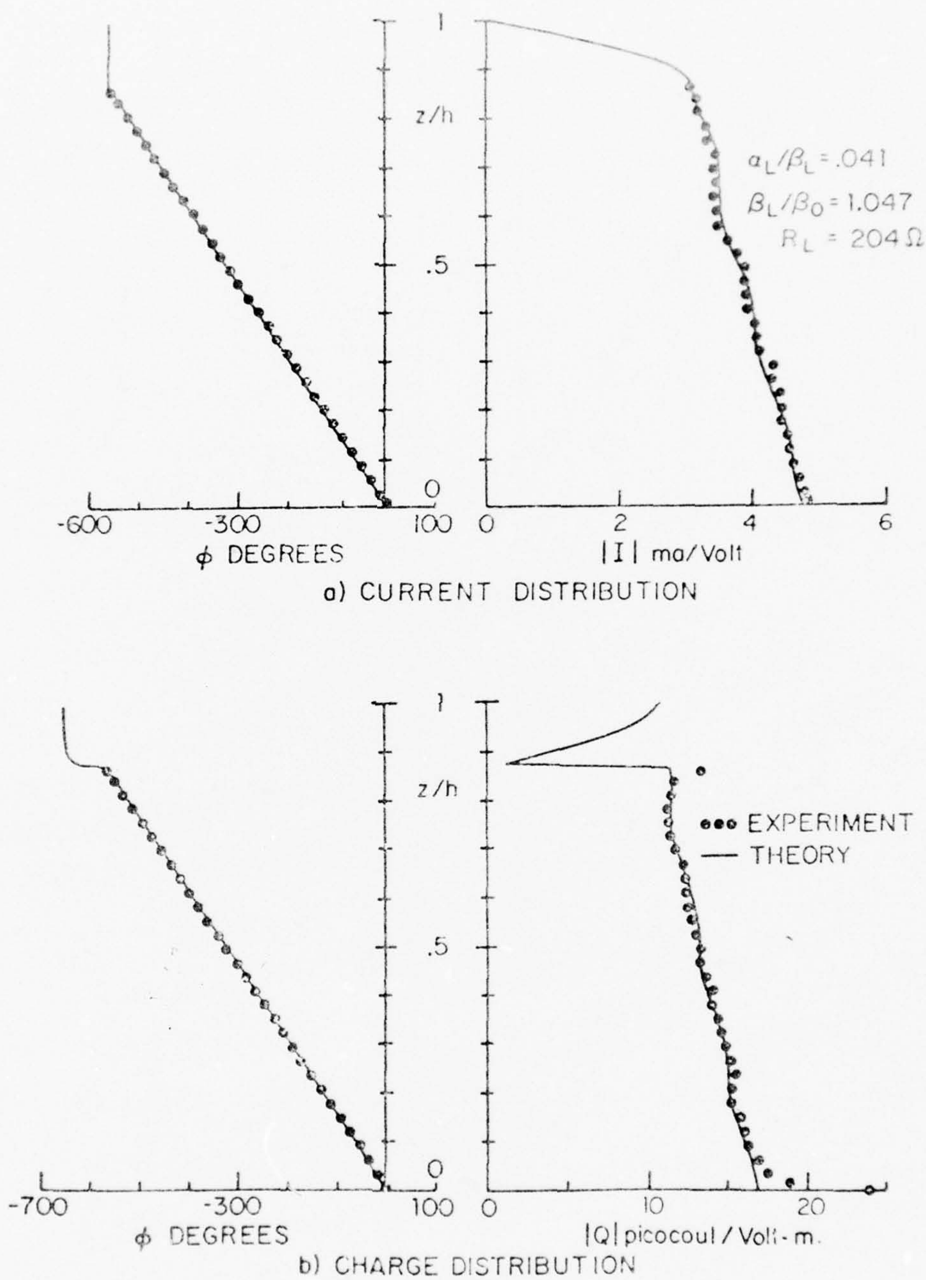


FIG. 3.104. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

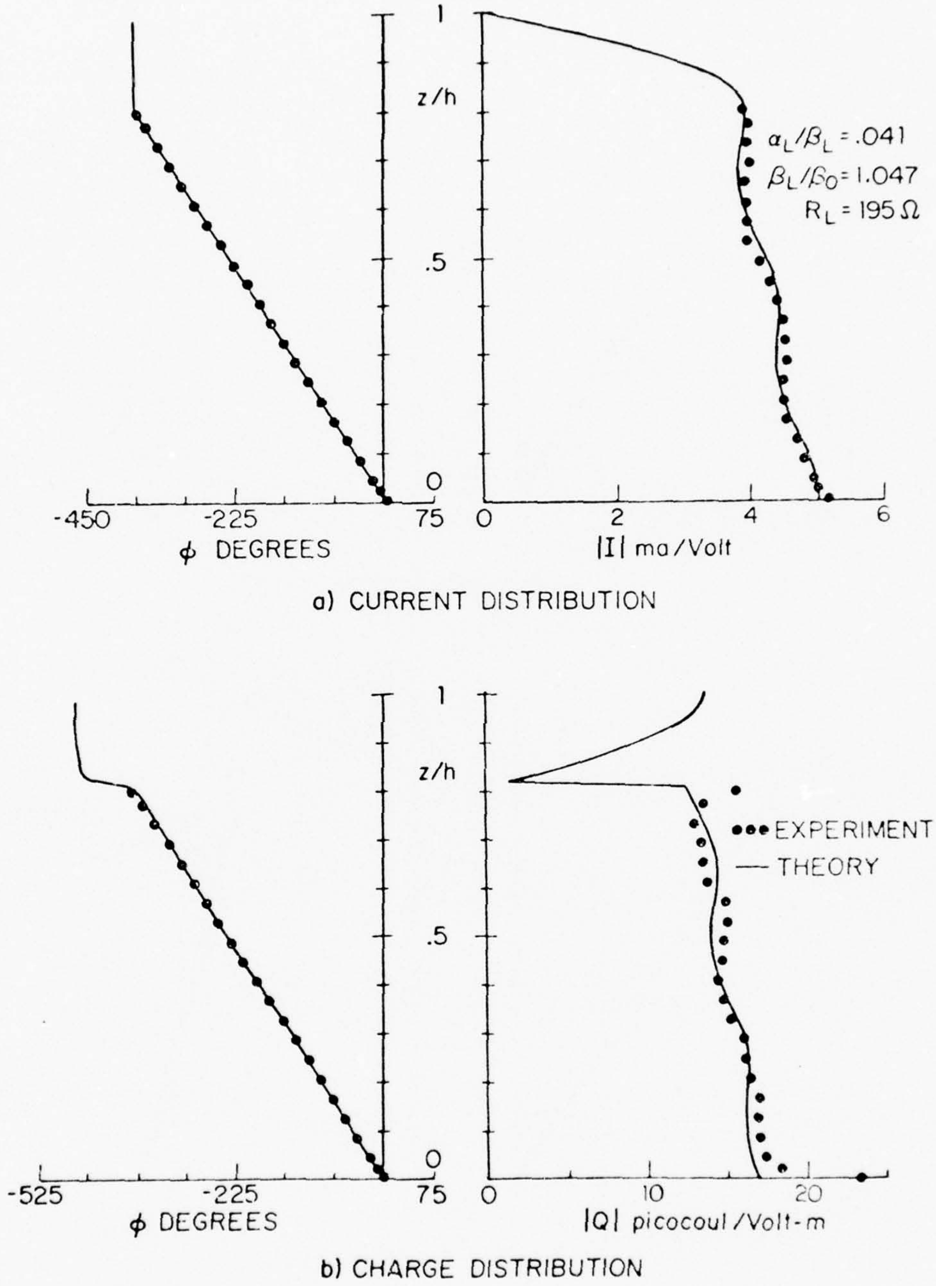


FIG. 3.105. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

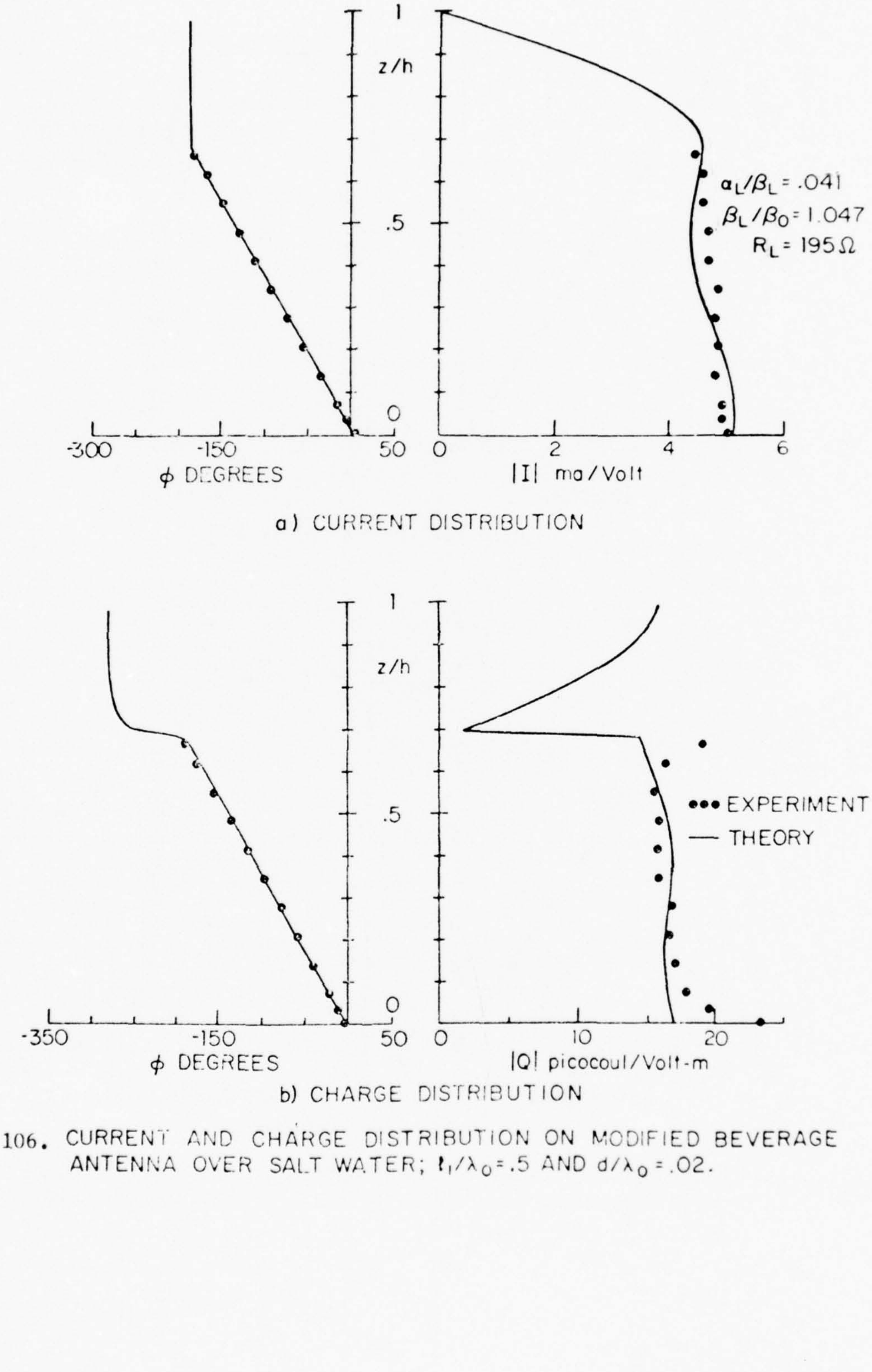


FIG. 3.106. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; ℓ_1/λ_0=.5 AND d/λ_0=.02.

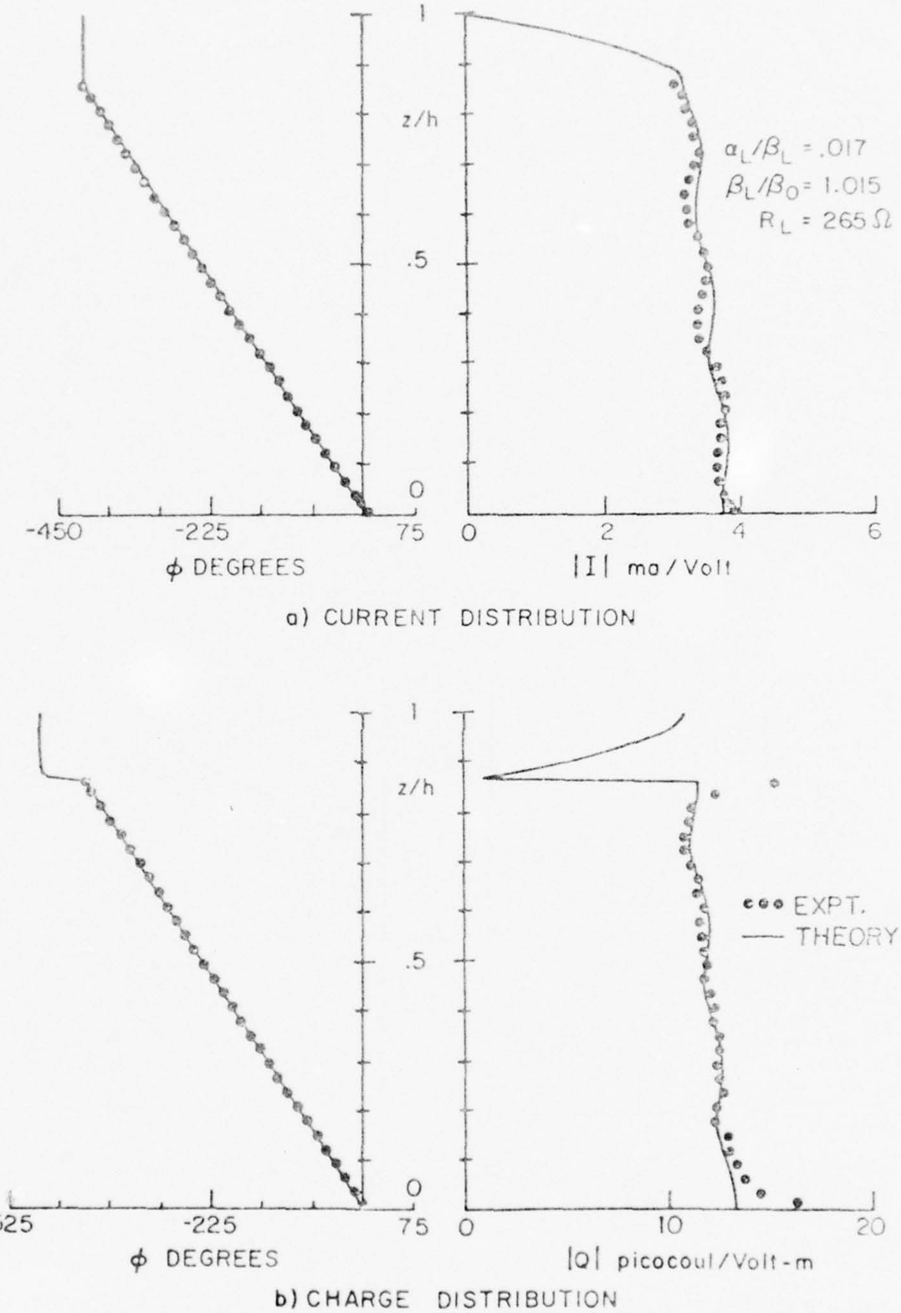


FIG. 3.107. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING THEORETICAL WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

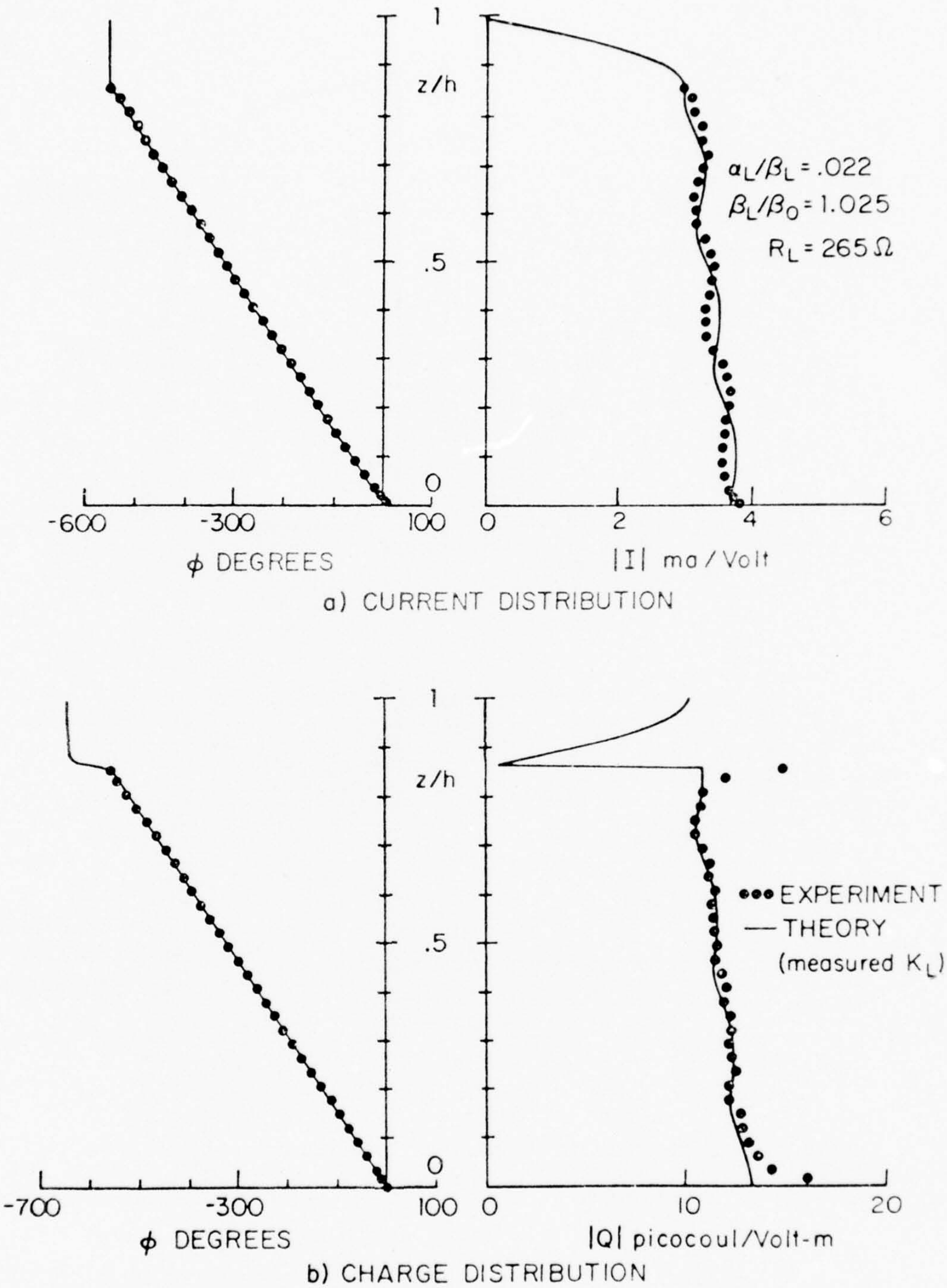


FIG. 3.108. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

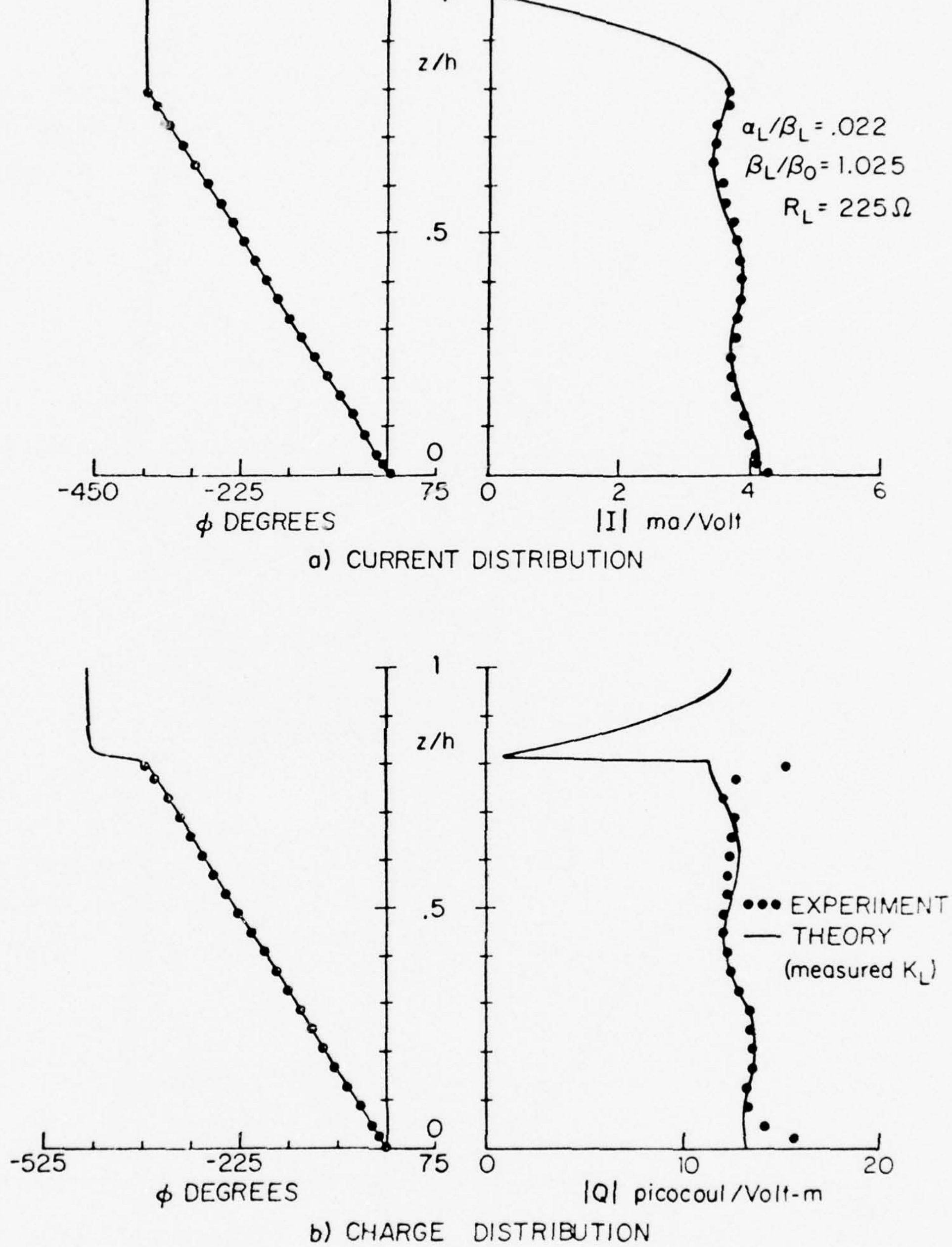


FIG. 3.109. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.

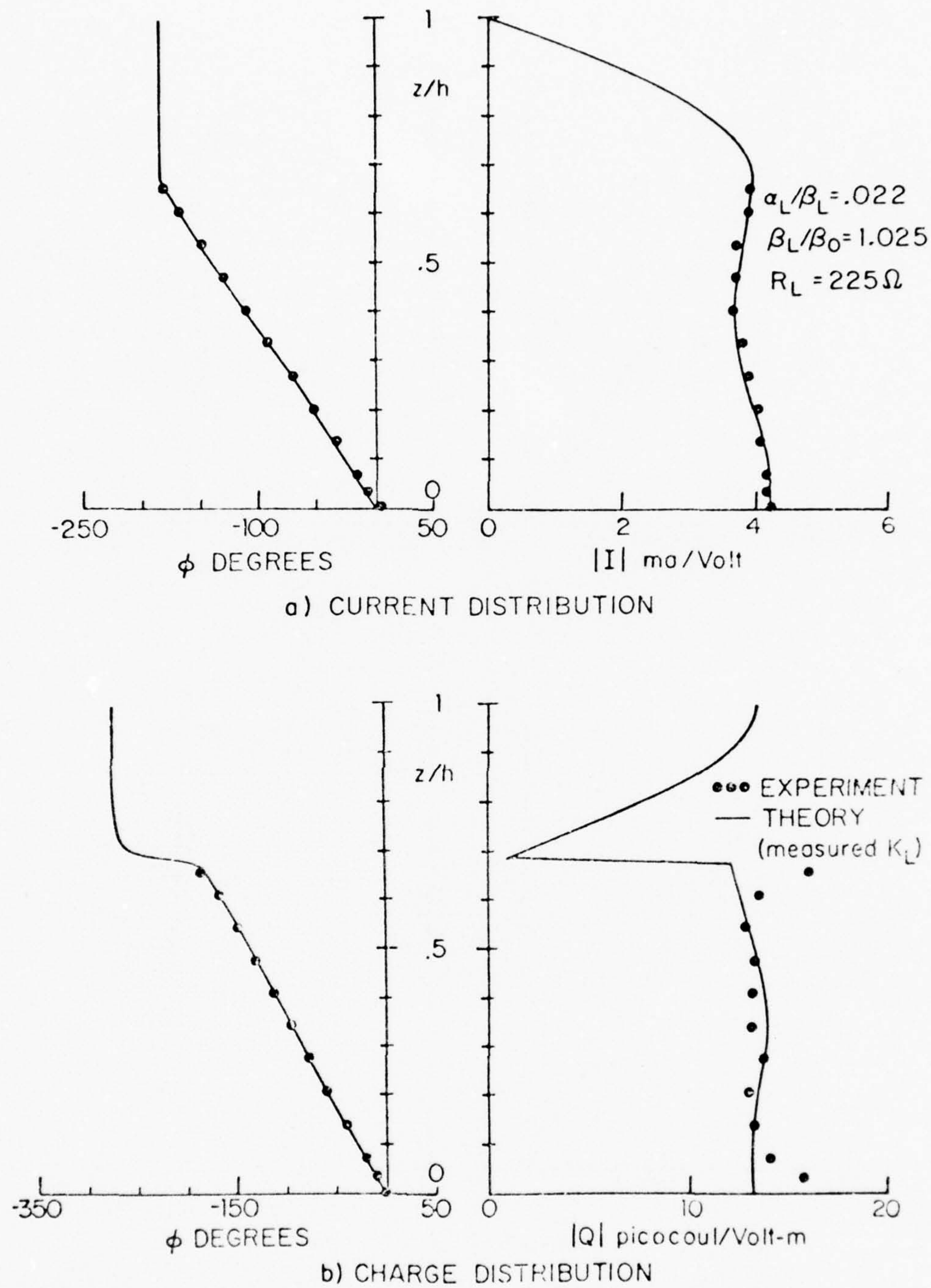


FIG. 3.110. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

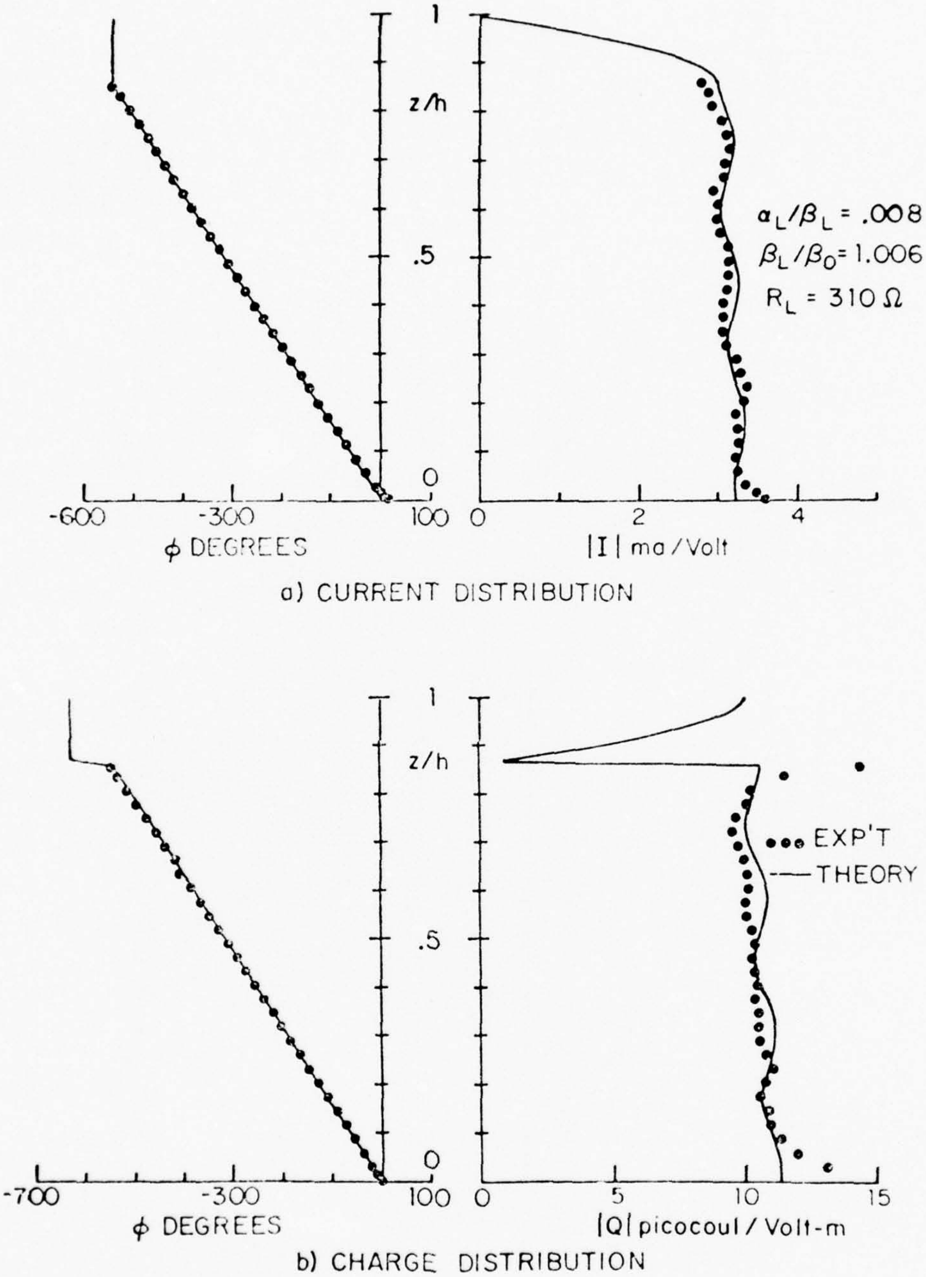


FIG. 3.111. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING THEORETICAL WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.

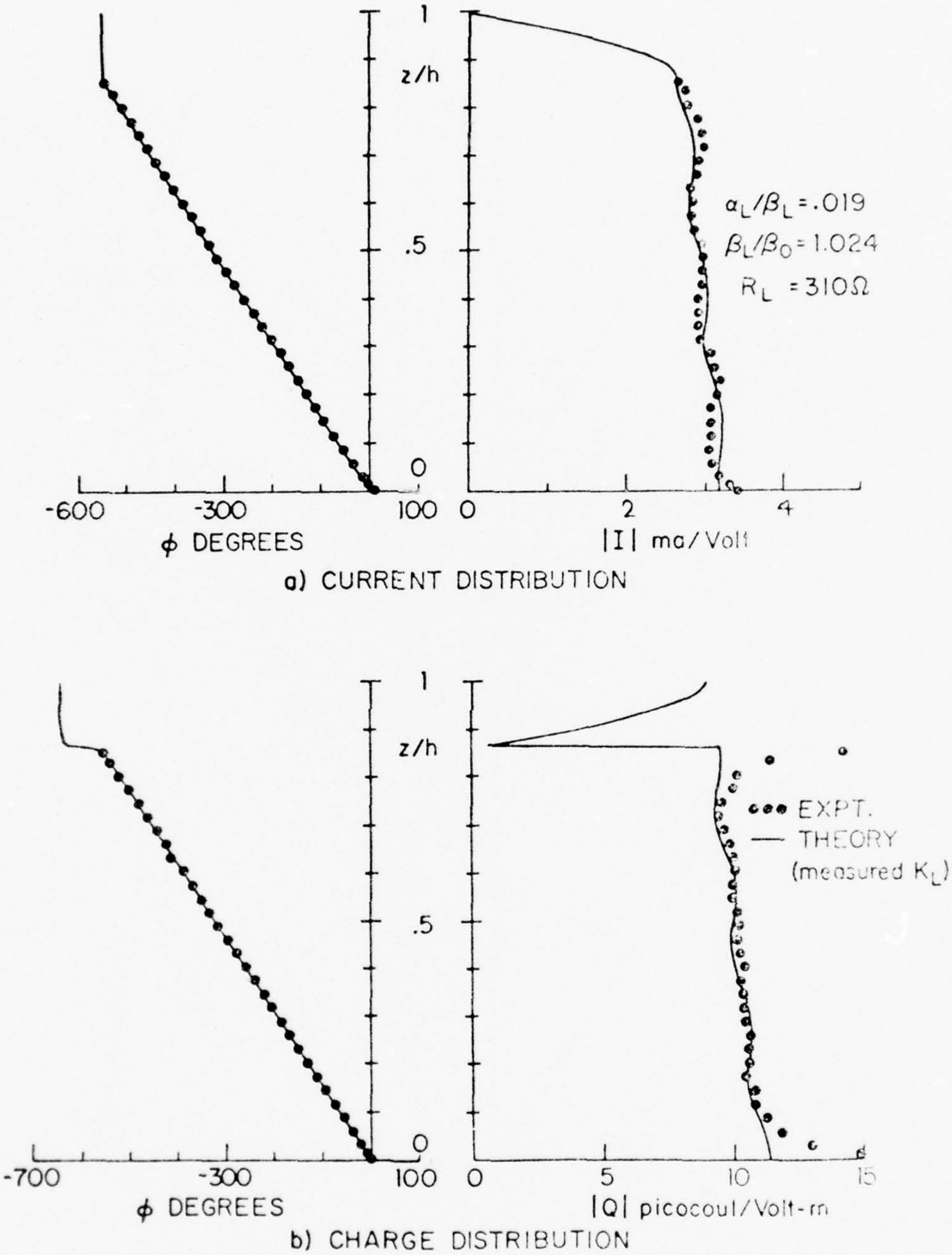
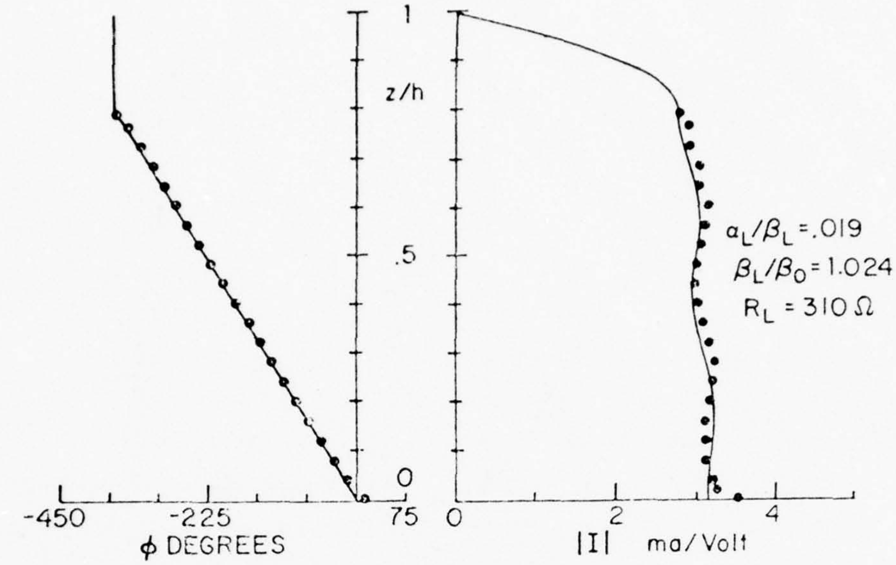
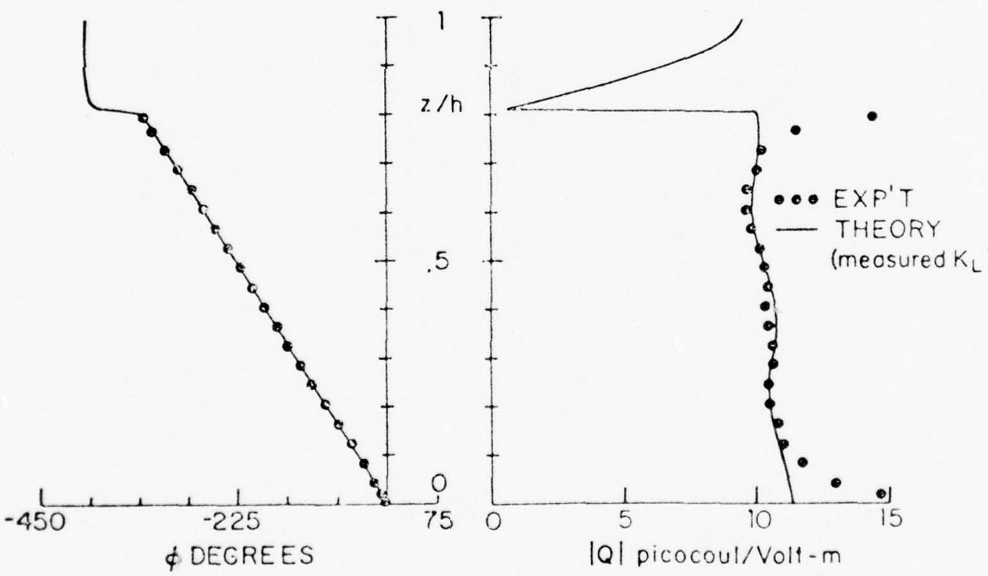


FIG. 3.112. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.113. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0= 1 AND d/λ_0= .1

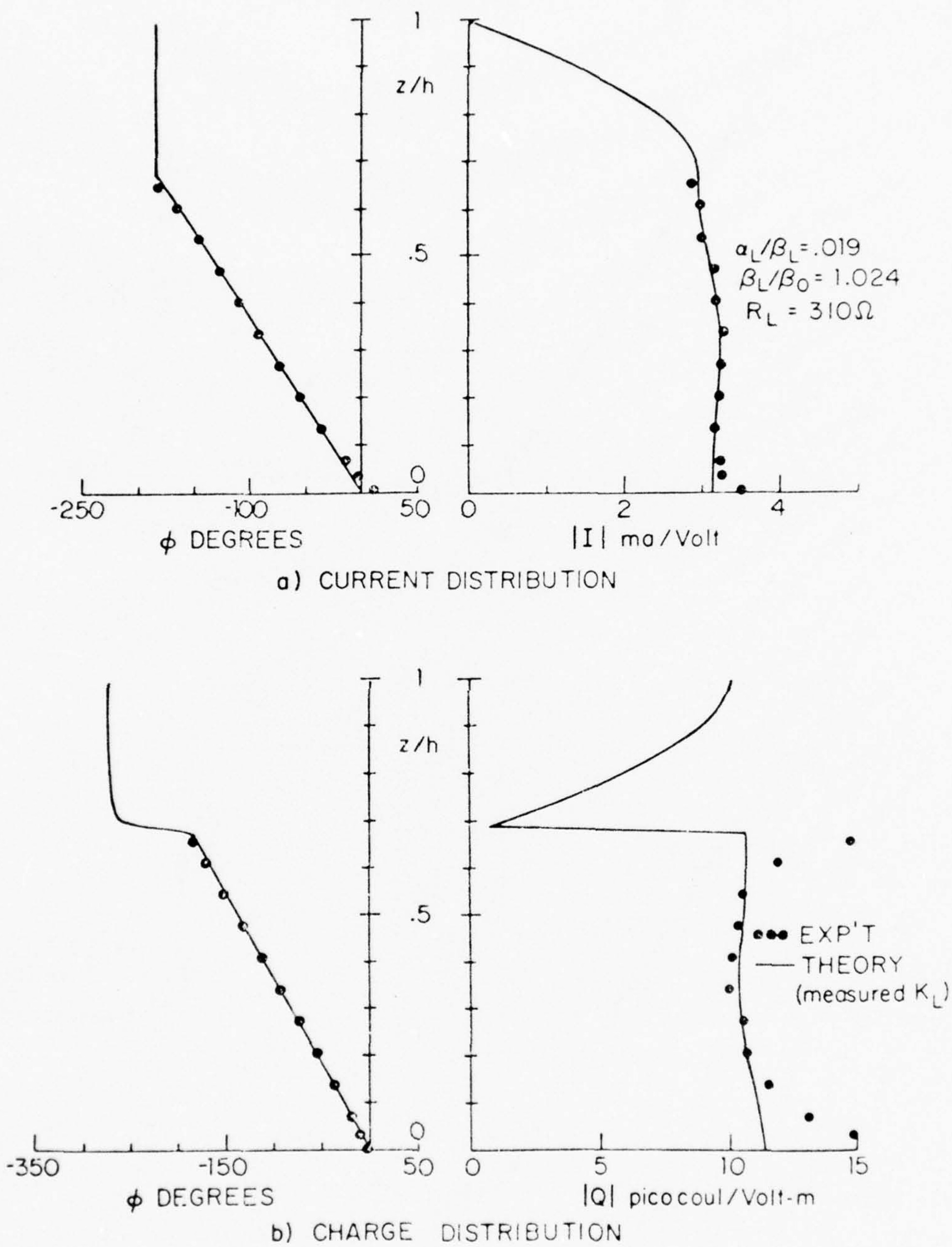


FIG. 3.114. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; ℓ_1/λ_0=.5 AND d/λ_0=.1.

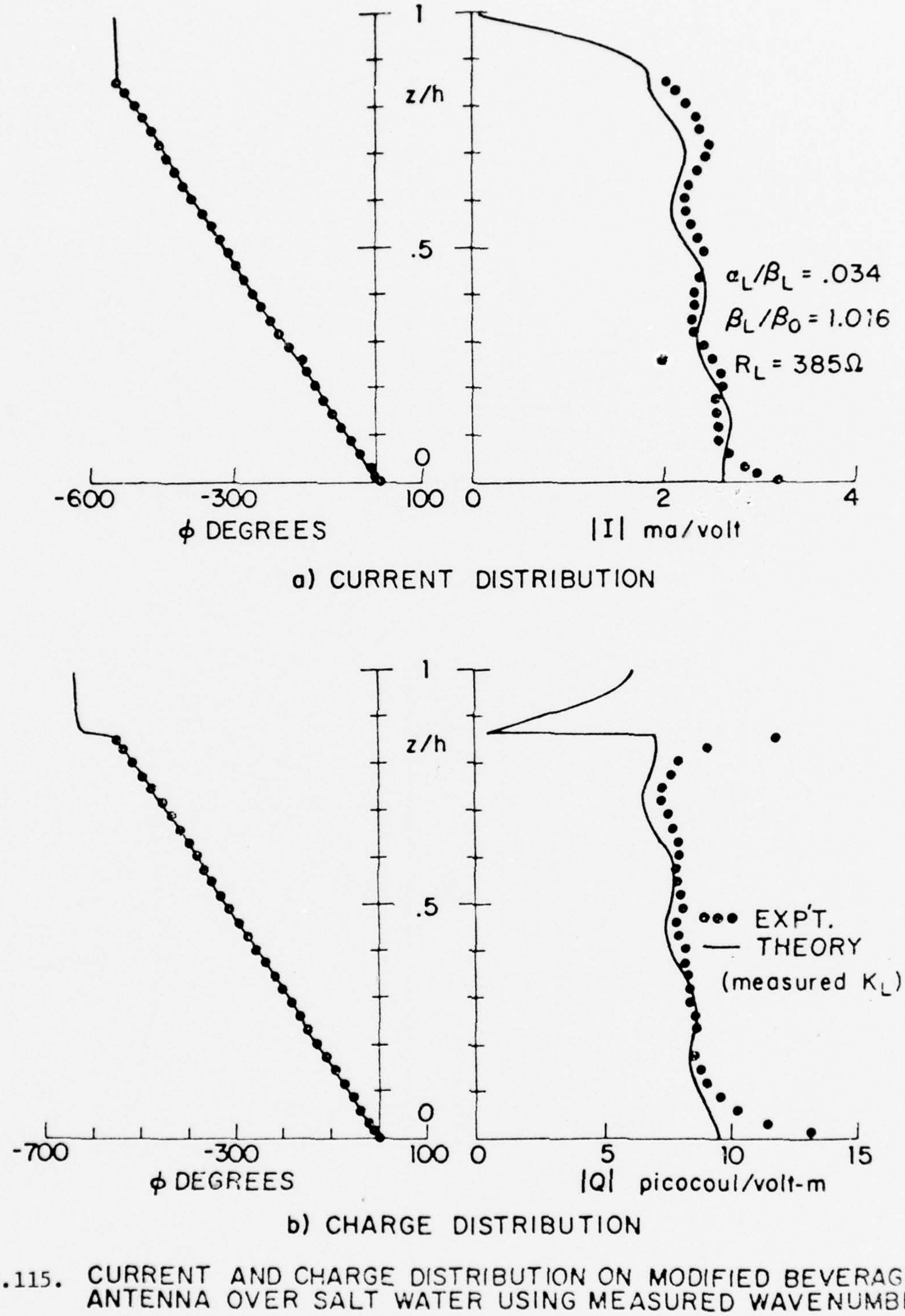


FIG. 3.115. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .25$.

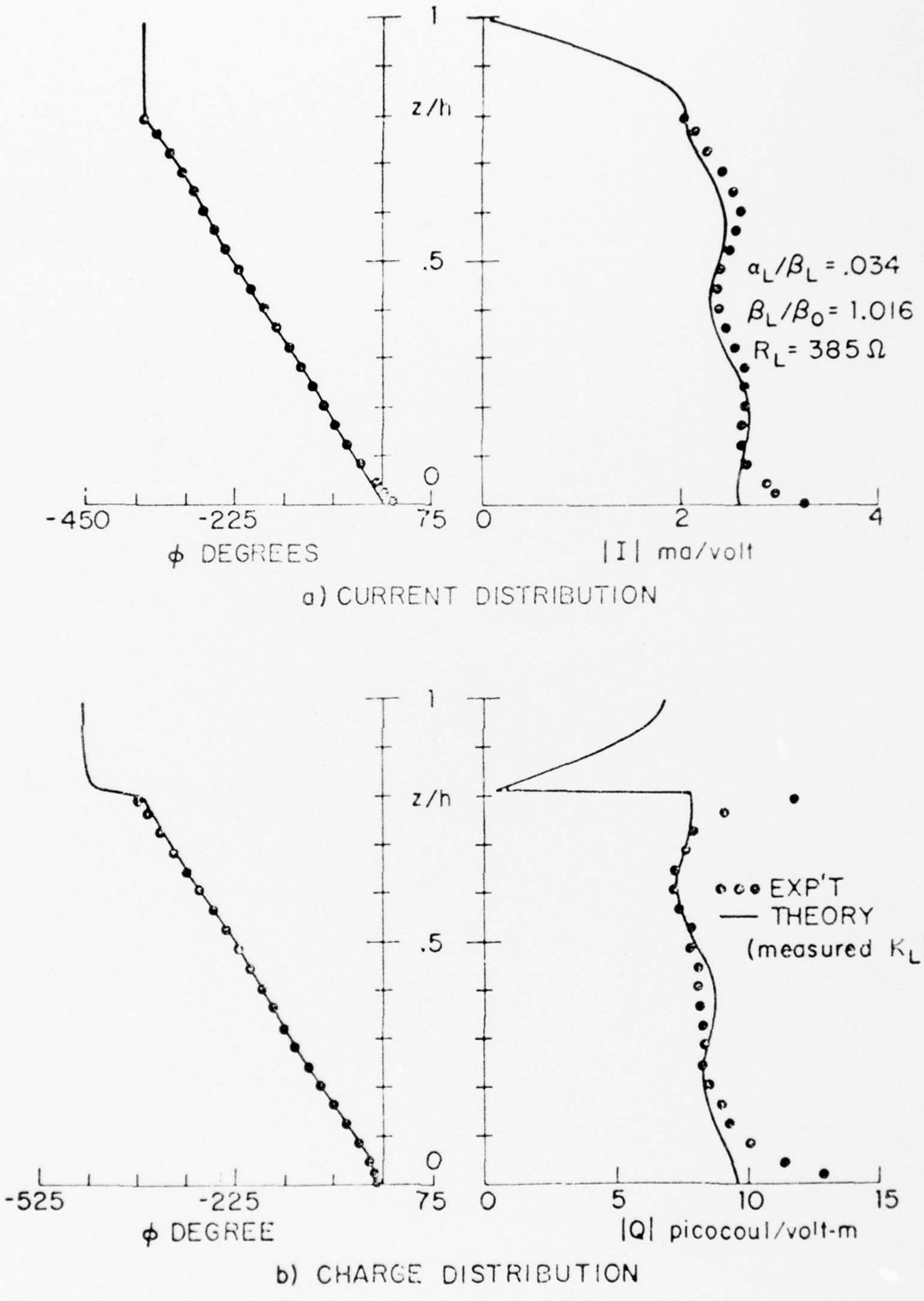
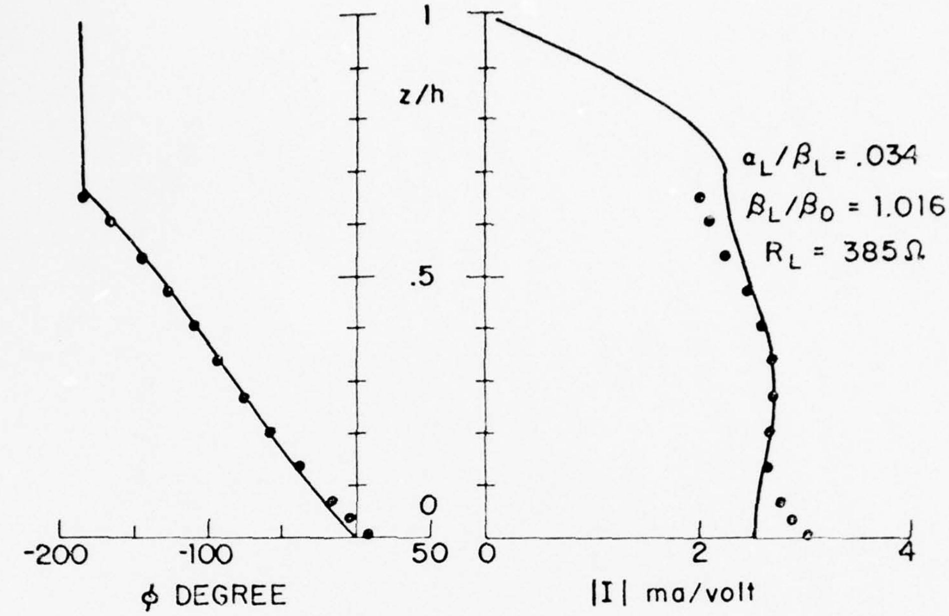
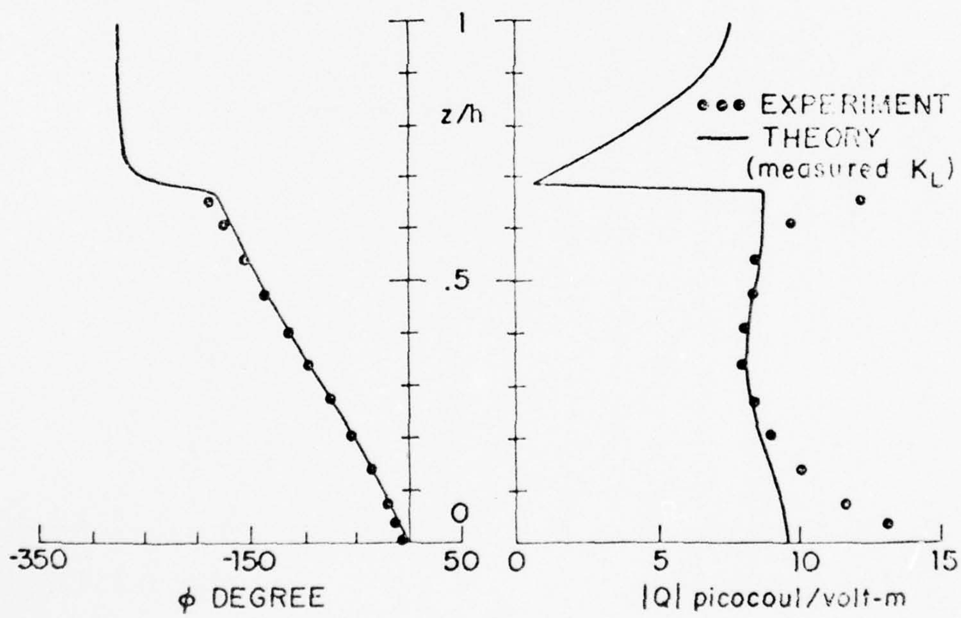


FIG. 3.116. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.117. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = .5$ AND $d/\lambda_0 = .25$

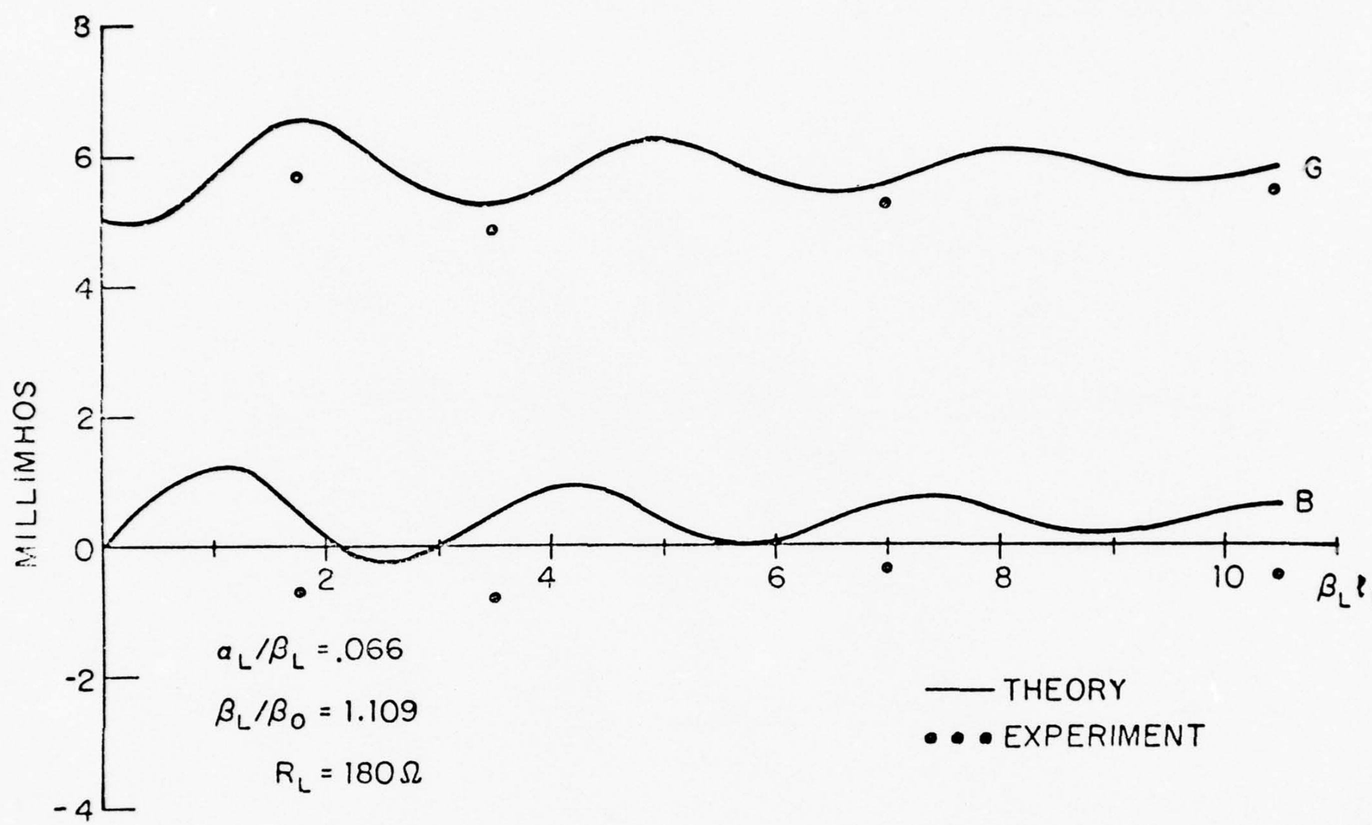


FIG. 3.118. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $d/\lambda_0 = .01$ AND $a/\lambda_0 = .0015$.

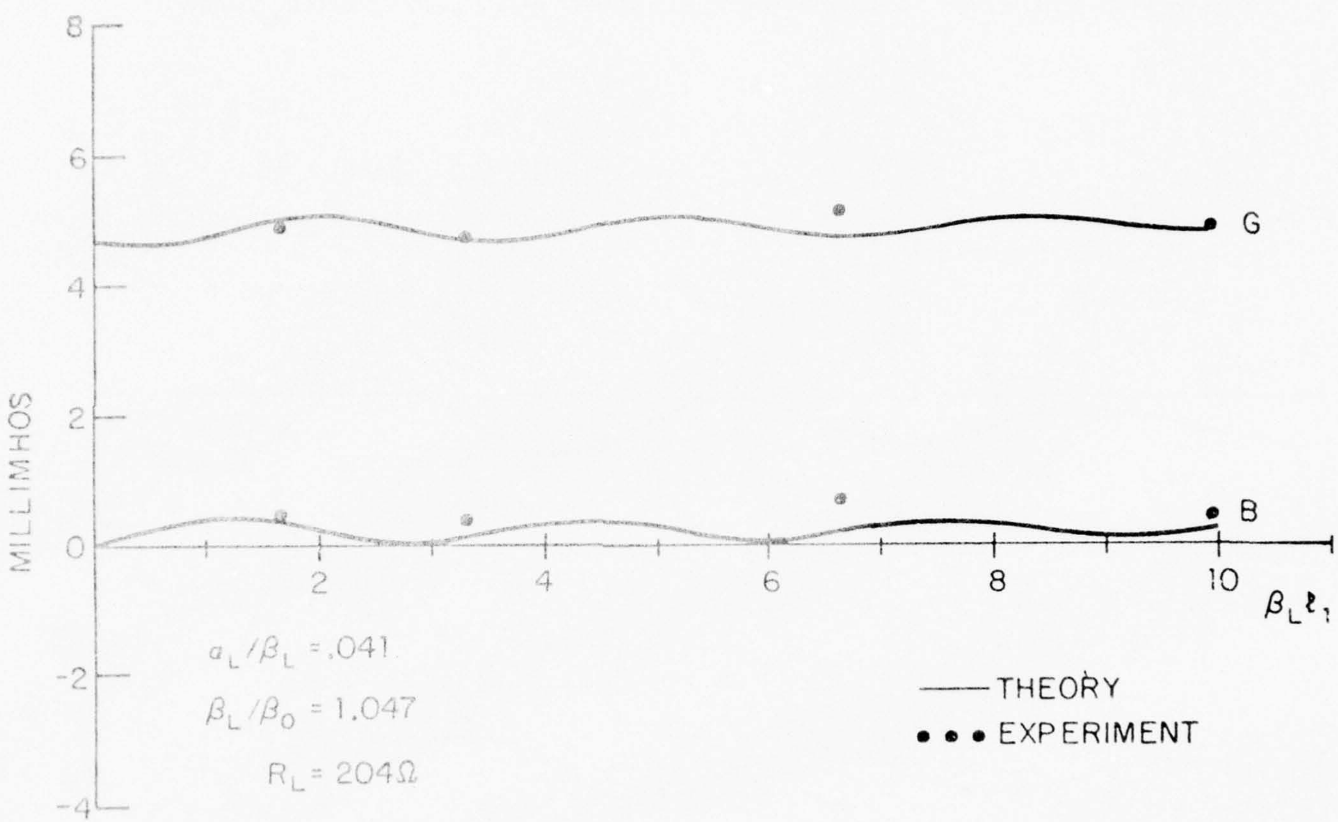


FIG. 3.119. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

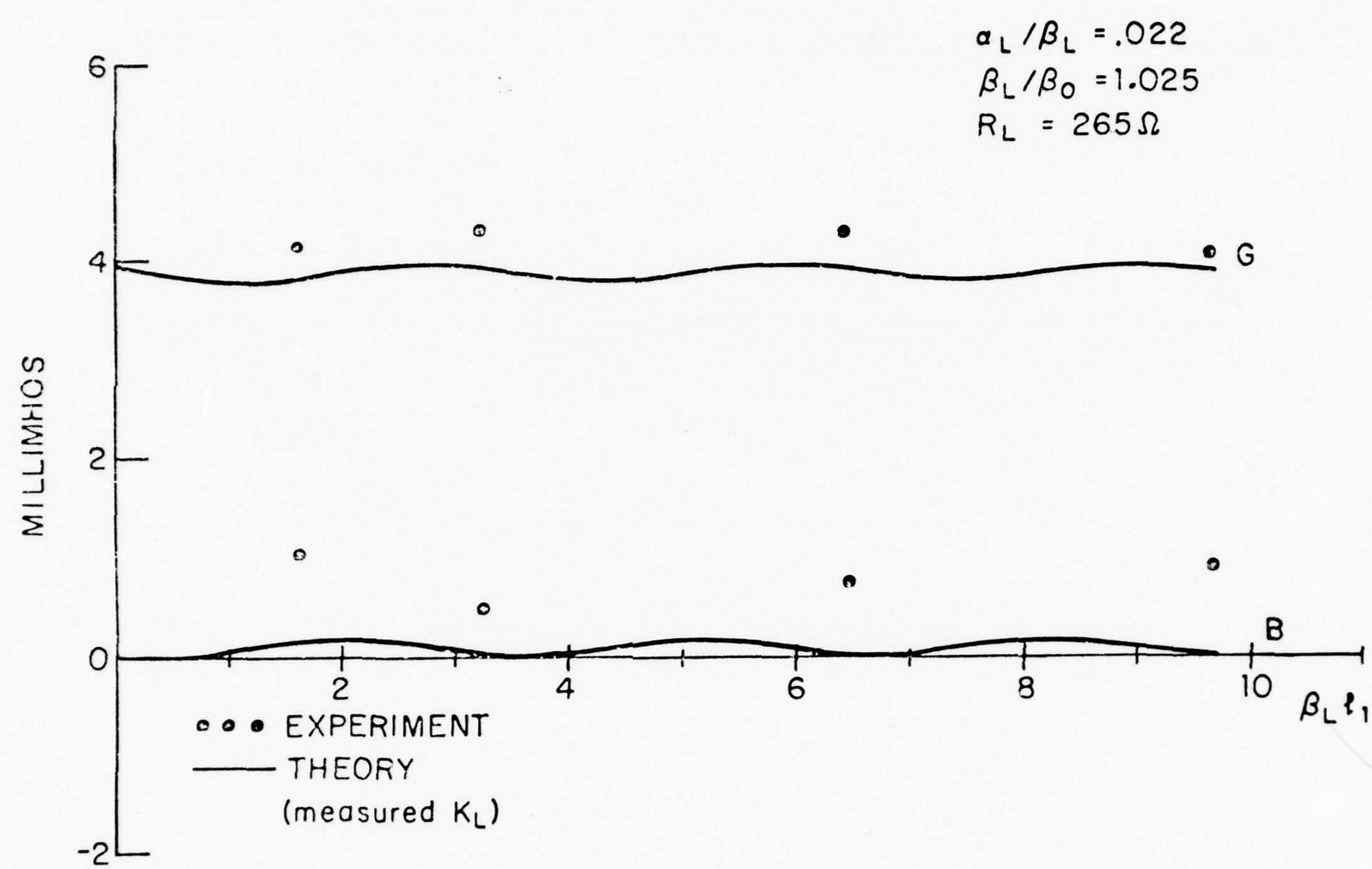


FIG. 3.120. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED K_L; d/λ_0 = .05 AND a/λ_0 = .0015.

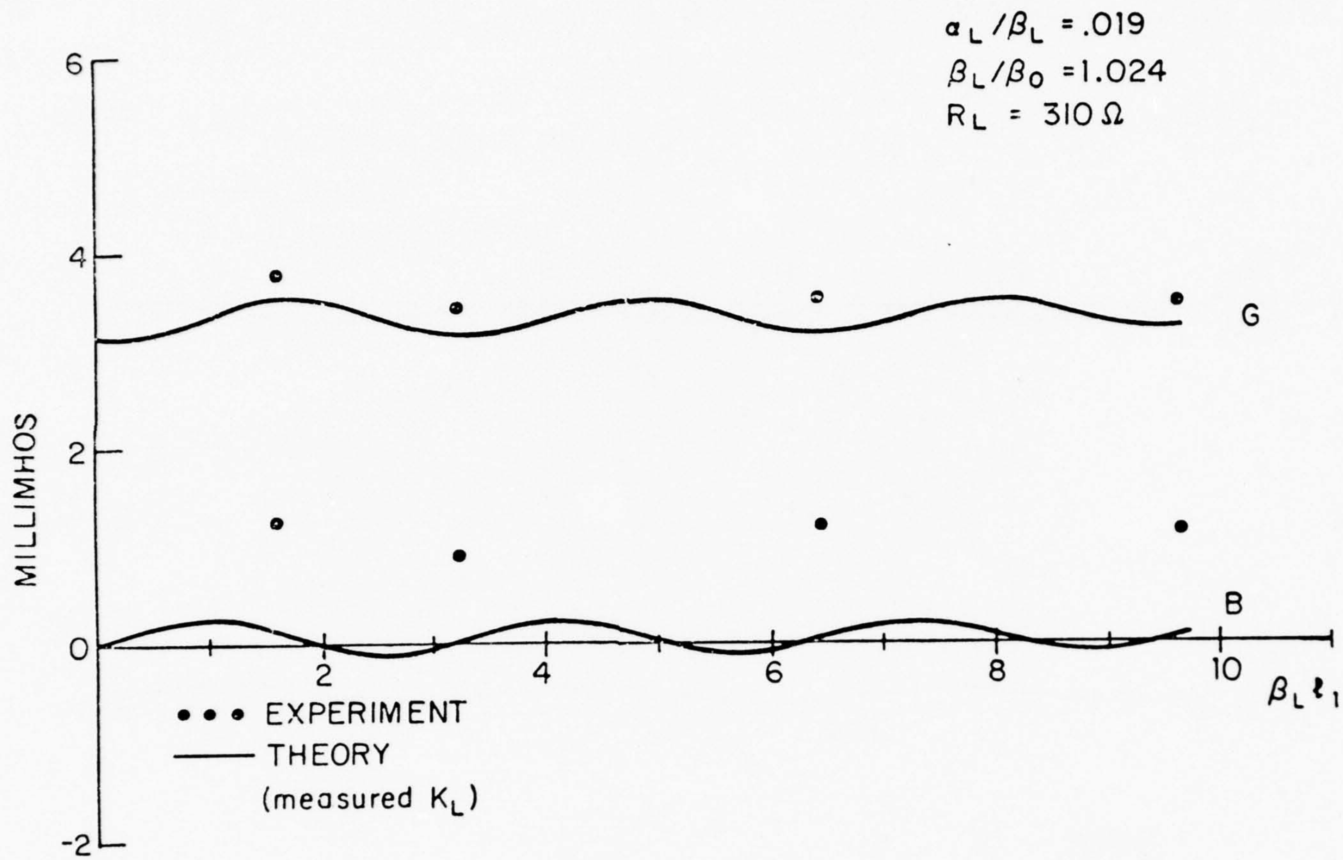


FIG. 3.121. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED K_L; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$.

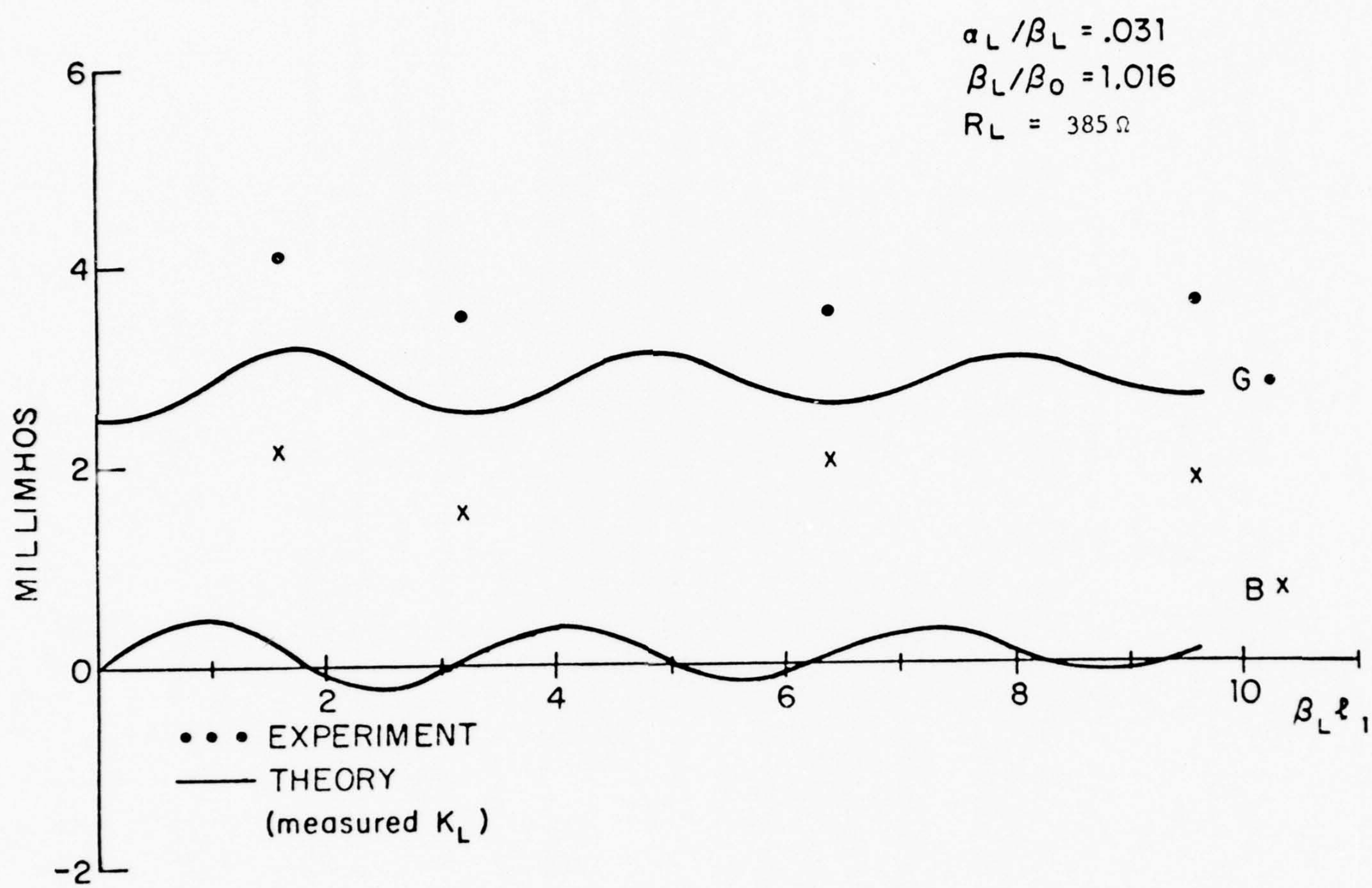


FIG. 3.122. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED K_L; $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$.

wave number. All other theoretical curves utilize the same expression but employ the measured effective wave number for k_L. Comparisons of the load resistors used with the calculated values appear in the chart below.

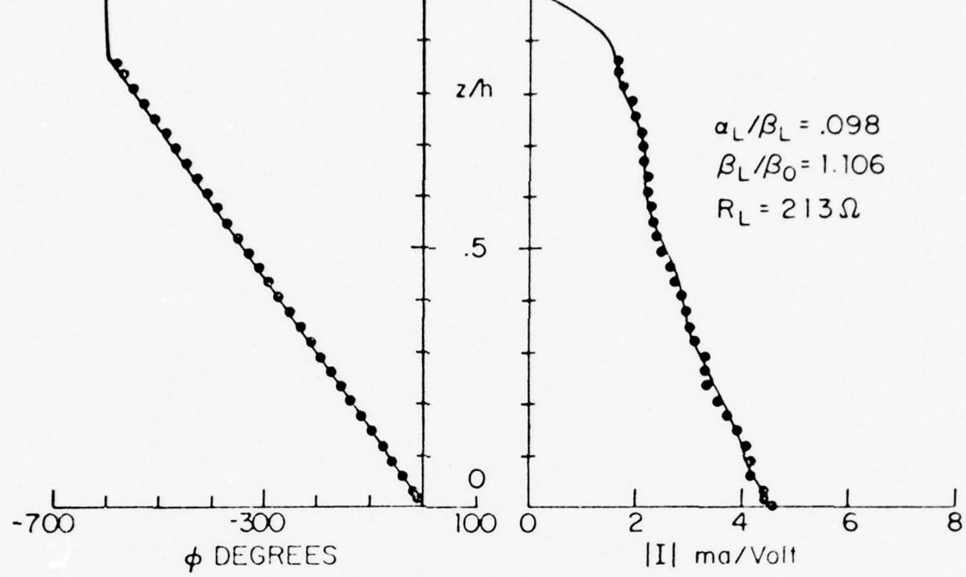
d/λ_0	R_L used	$(1/2)Z_c$ King	$(1/2)Z_c$ from measured k_L
.01	180 Ω	172 - j12 Ω	---
.02	204 Ω	206 - j8 Ω	---
.05	225 Ω	255 - j4 Ω	258 - j5 Ω
.1	310 Ω	295 - j2 Ω	300 - j6 Ω
.25	385 Ω	348 - j1 Ω	354 - j12 Ω

Moist-Earth Measurements

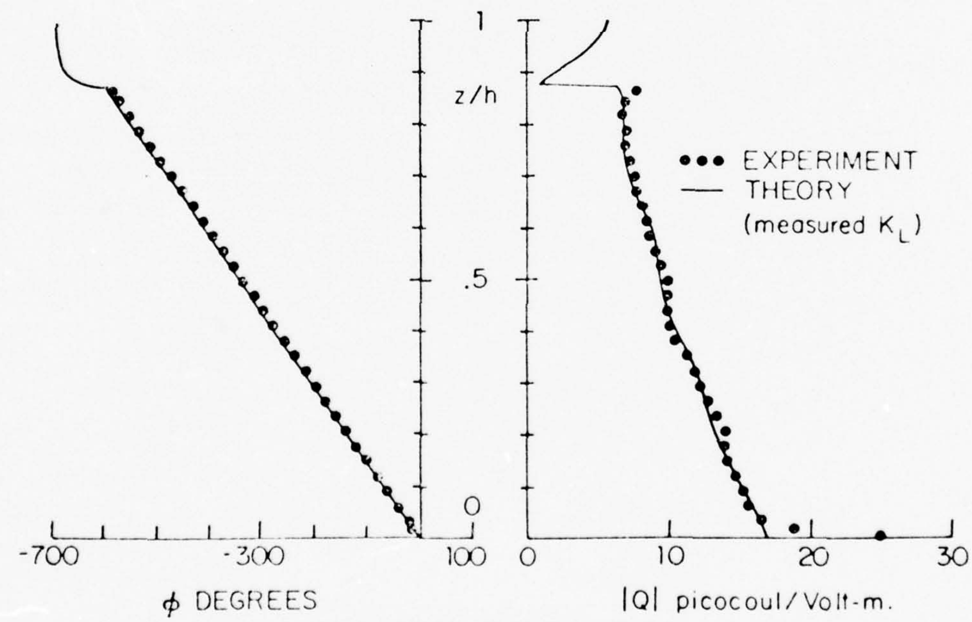
Due to the fact that condition (1.3b) is not strictly valid for the case of moist earth with $\epsilon_r = 11.5$ and $\sigma = .0022$ mhos/m, only measured effective wave numbers were used throughout for k_L in (1.54) and (1.56). The current and charge distributions, displayed graphically in Figs. 3.123 through 3.134, reveal good agreement between the measured results and the curves based on the measured wave number. Even for the highest spacing, $d/\lambda_0 = .25$, the agreement is quite good except for variations at the driving point and at the load resistor which are basically a manifestation of junction effects.

The admittance curves appear in Figs. 3.135 through 3.138. Agreement for the closest spacing, $d/\lambda_0 = .02$, is good for both conductance and susceptance curves. For the other three cases the conductance agreement is good with larger variations appearing in the susceptance. Resistor comparisons appear below.

d/λ_0	R_L used	$(1/2)Z_c$ King	$(1/2)Z_c$ from measured k_L
.01	---	---	---
.02	213 Ω	224 - j29 Ω	218 - j21 Ω
.05	242 Ω	262 - j21 Ω	259 - j16 Ω
.1	242 Ω	296 - j13 Ω	295 - j13 Ω
.25	380 Ω	348 - j6 Ω	358 - j12 Ω



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.123. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; ℓ_1/λ_0=1.5 AND d/λ_0=.02.

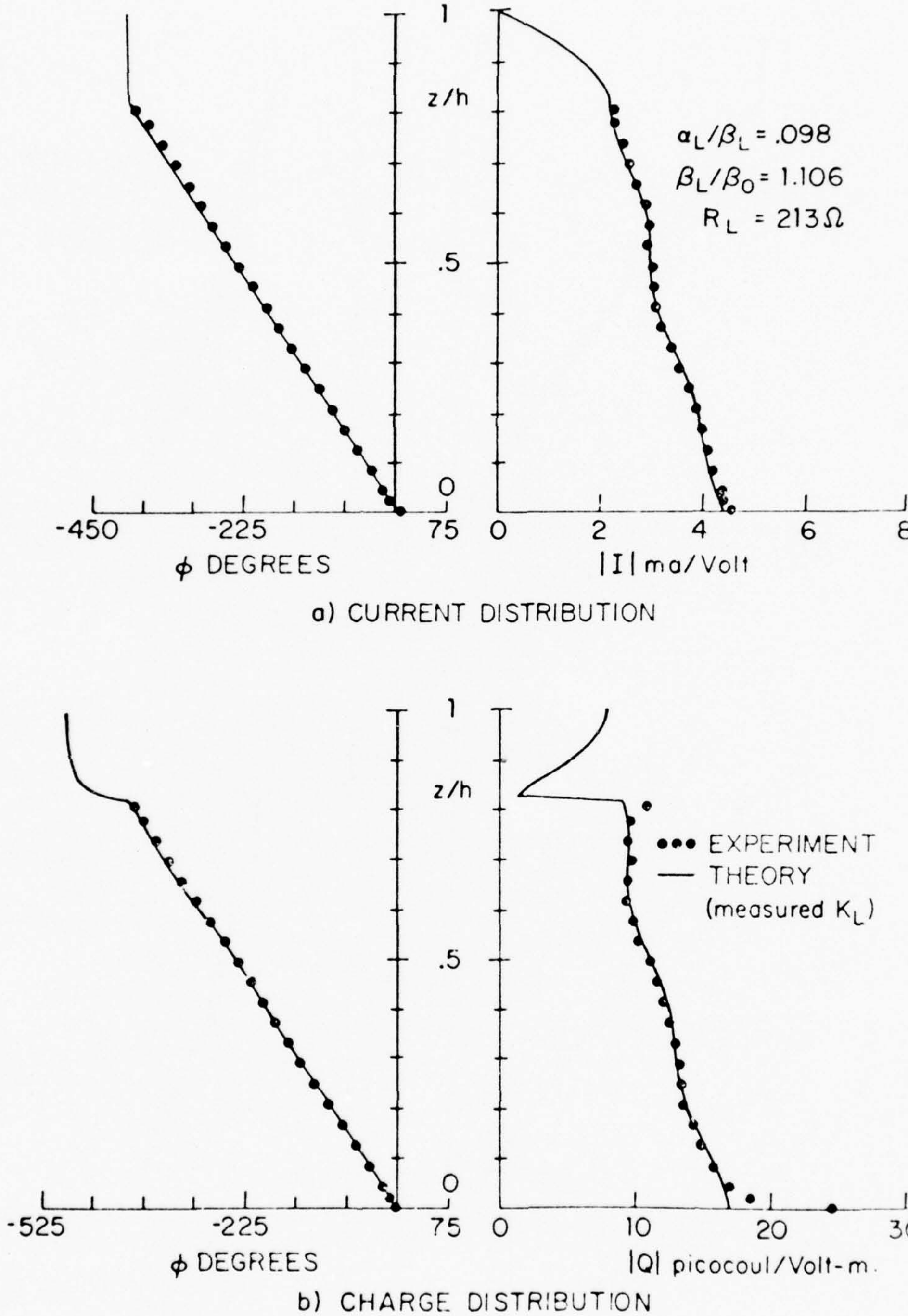
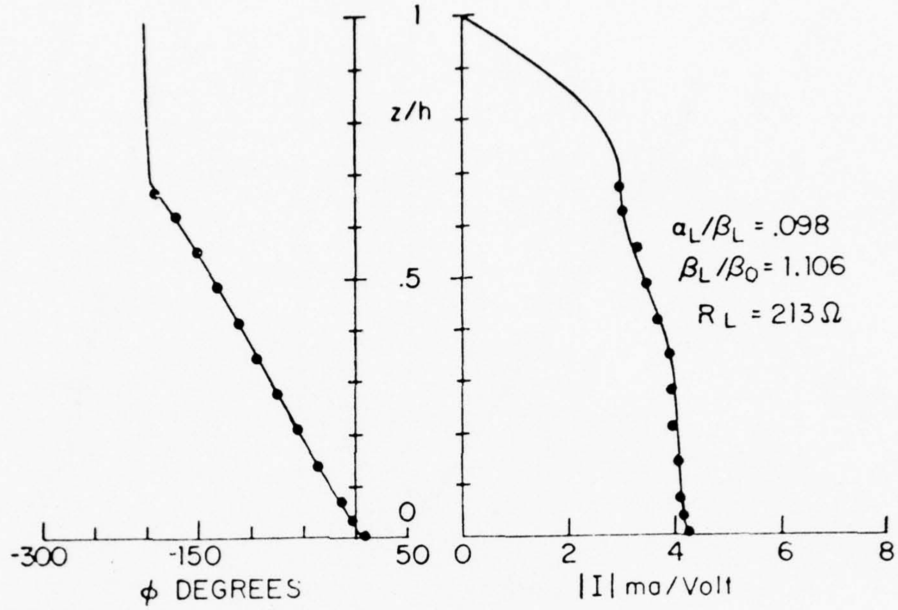
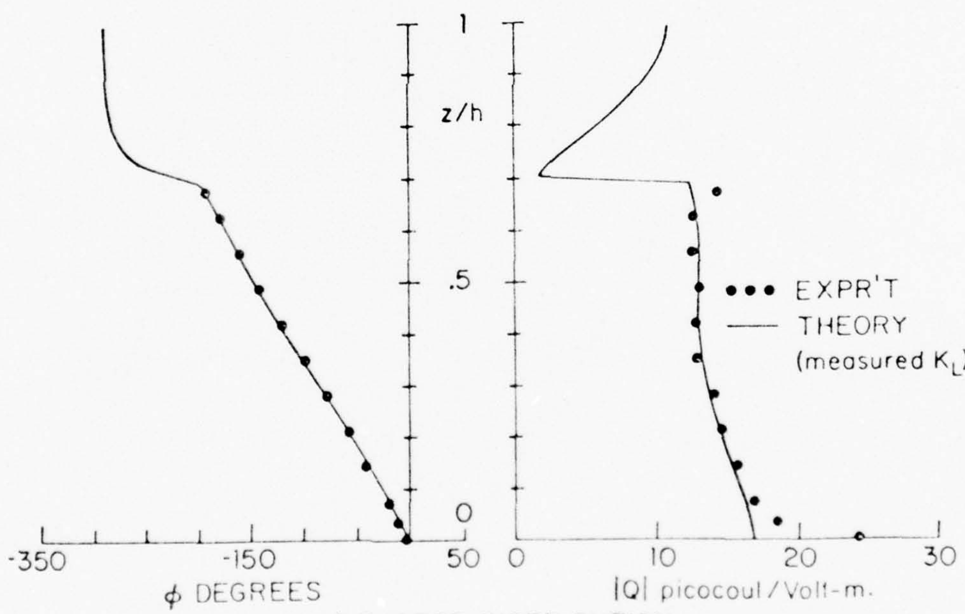


FIG. 3.124. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

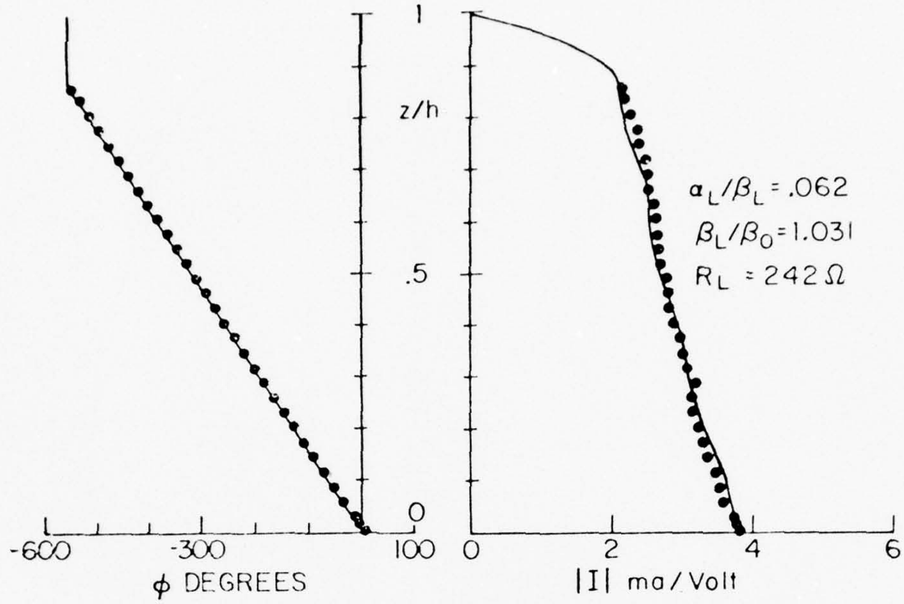


a) CURRENT DISTRIBUTION

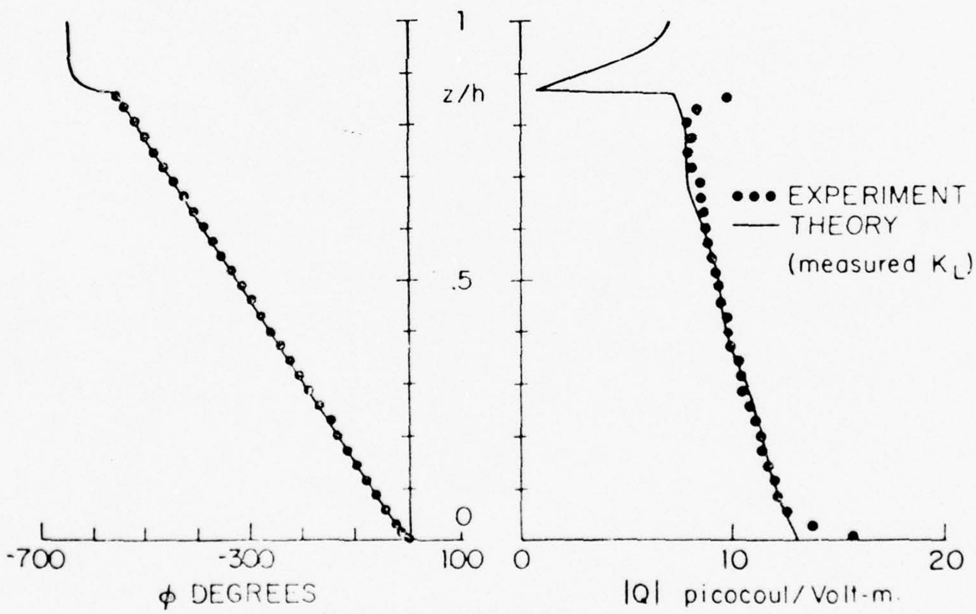


b) CHARGE DISTRIBUTION

FIG. 3.125. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; ℓ_1/λ_0 = .5 AND d/λ_0 = .02.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.126. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$

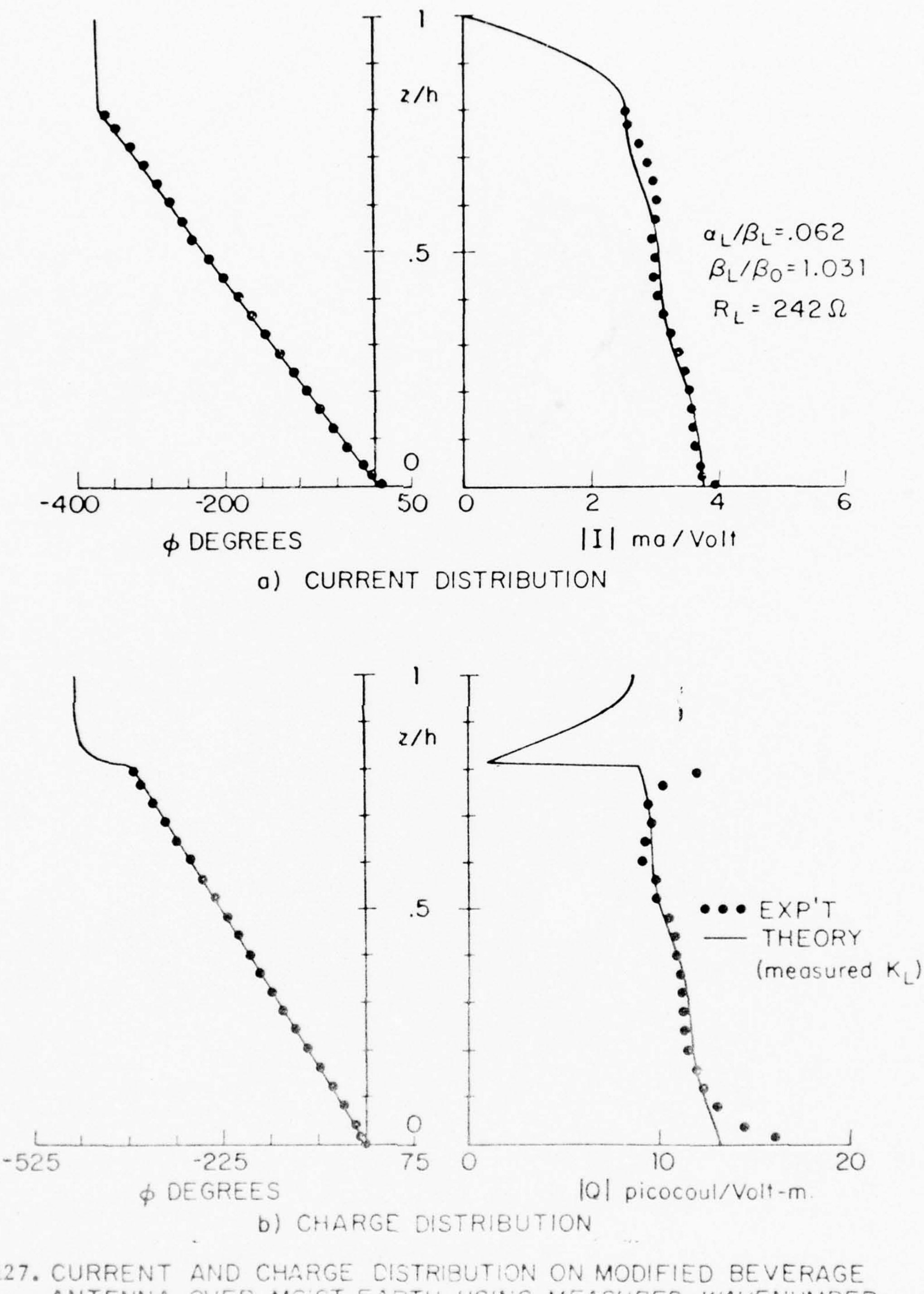


FIG. 3.127. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.

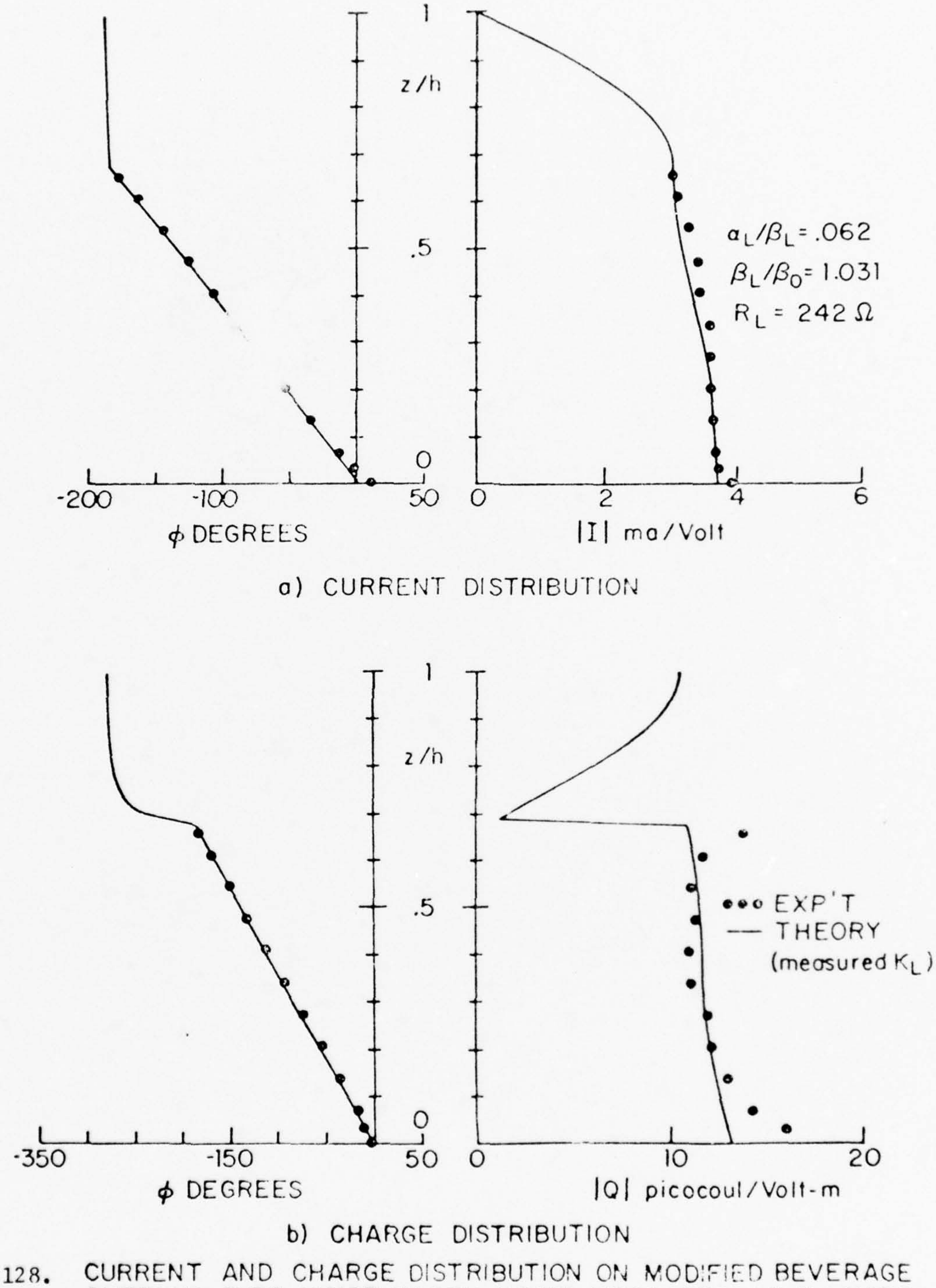


FIG. 3.128. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

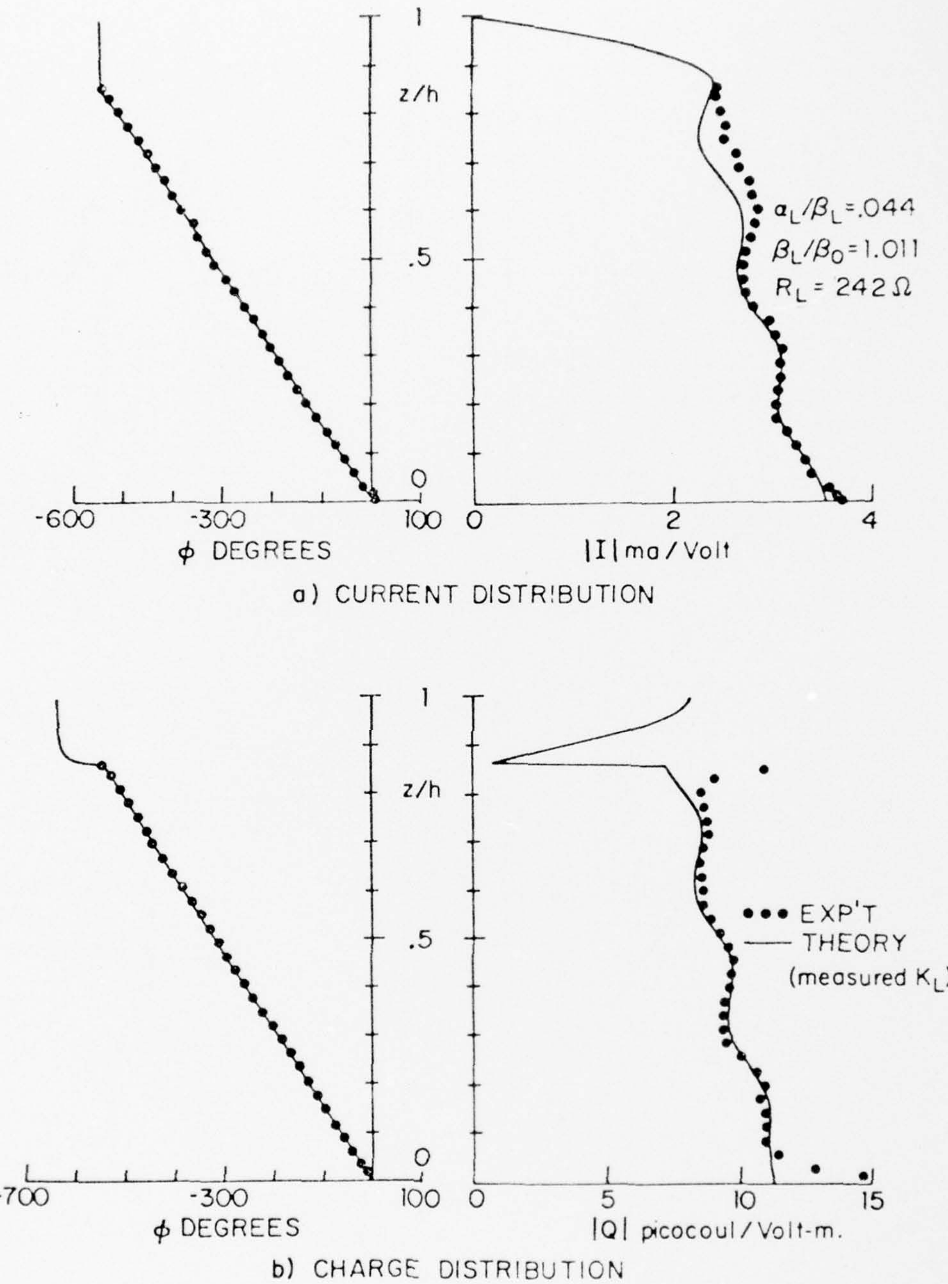


FIG. 3.129. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$

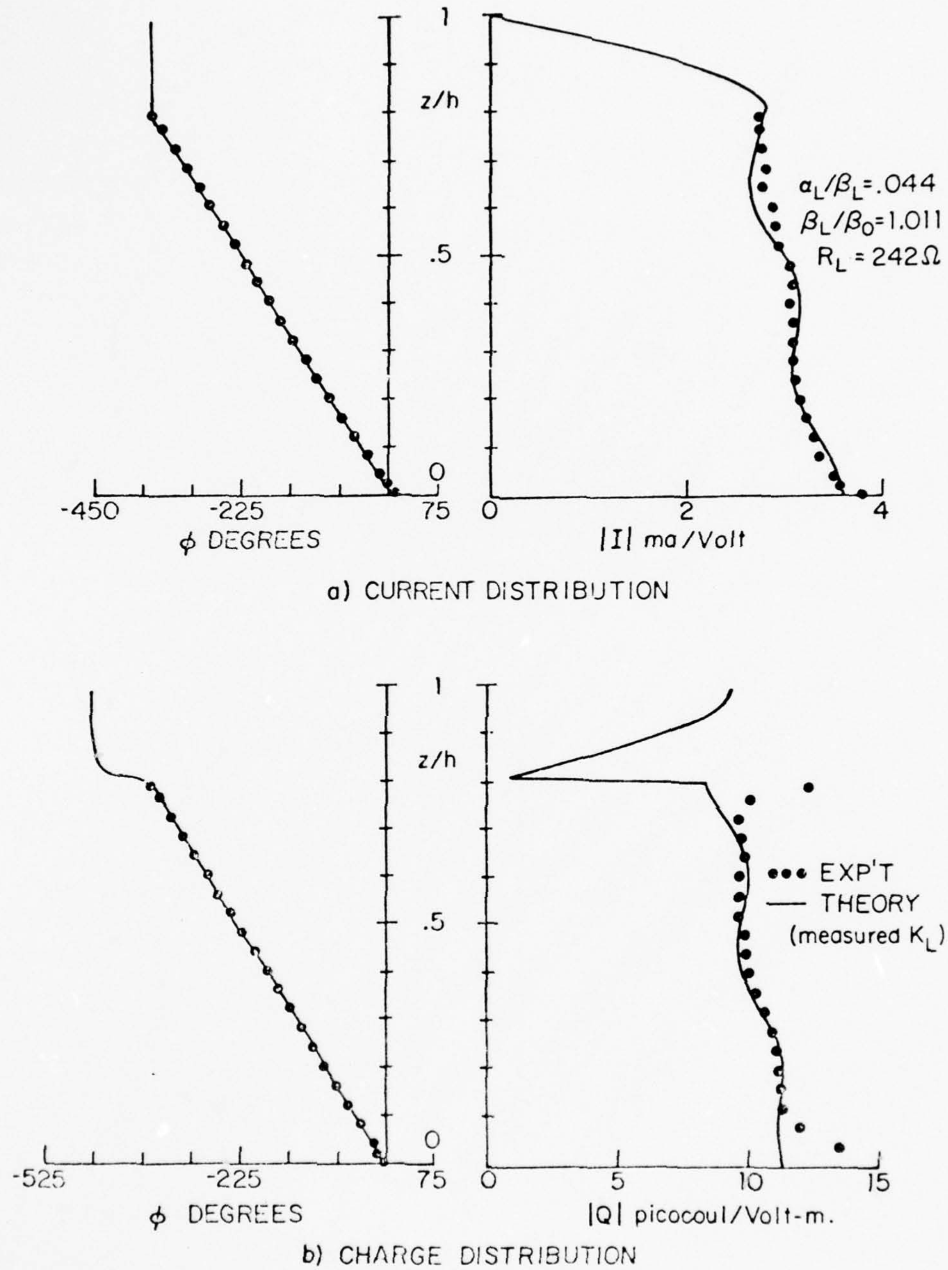


FIG. 3.130. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE WAVE ANTENNA OVER MOIST EARTH USING MEASURED WAVE-NUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

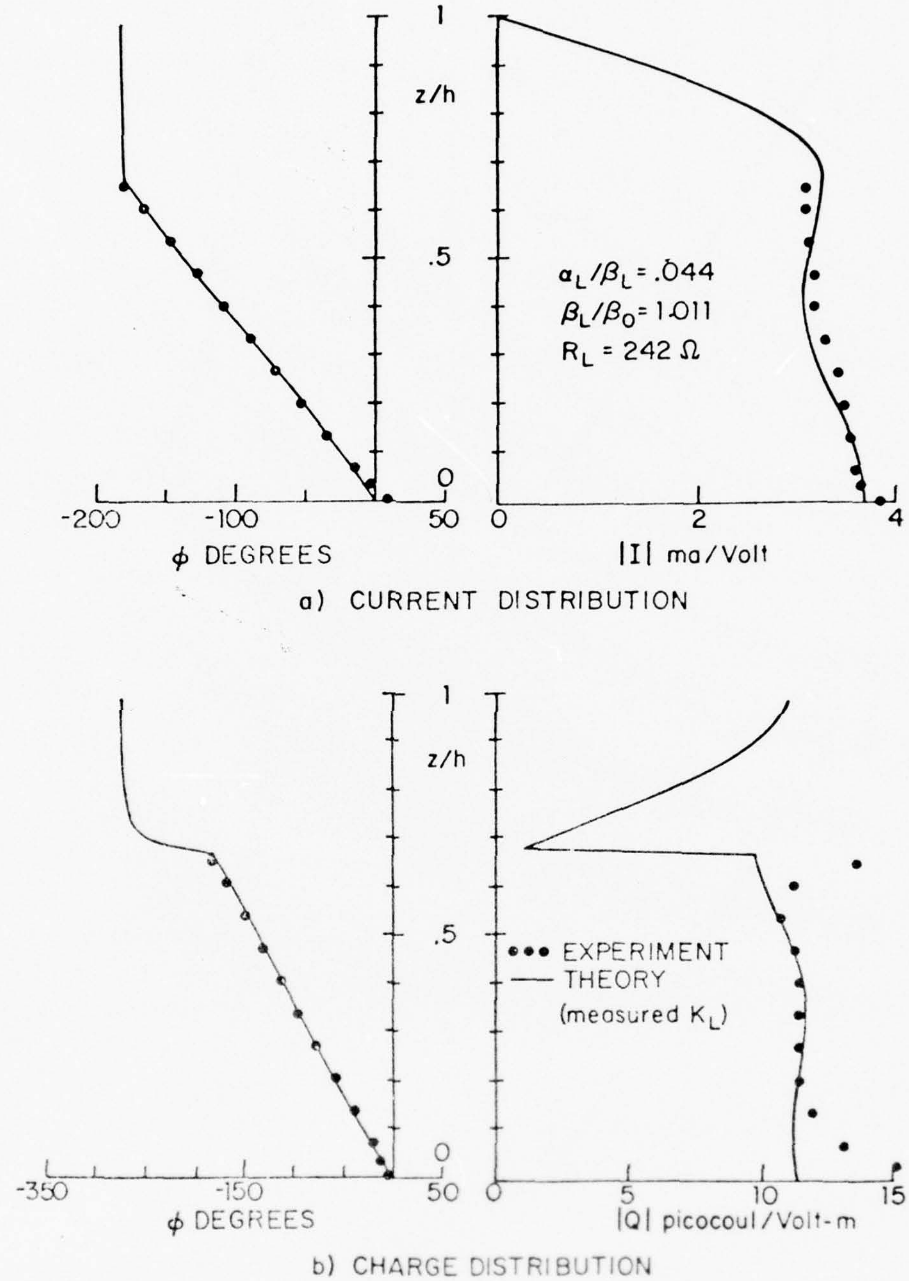
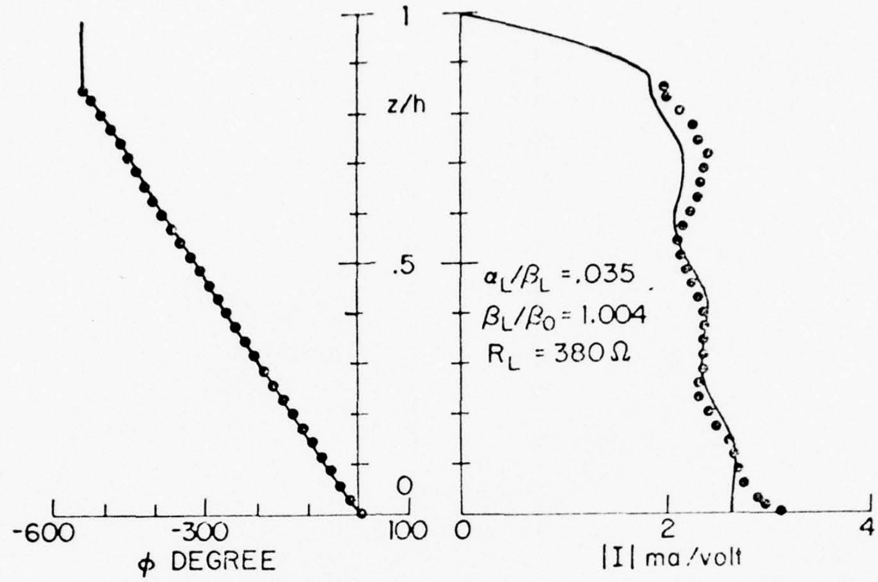
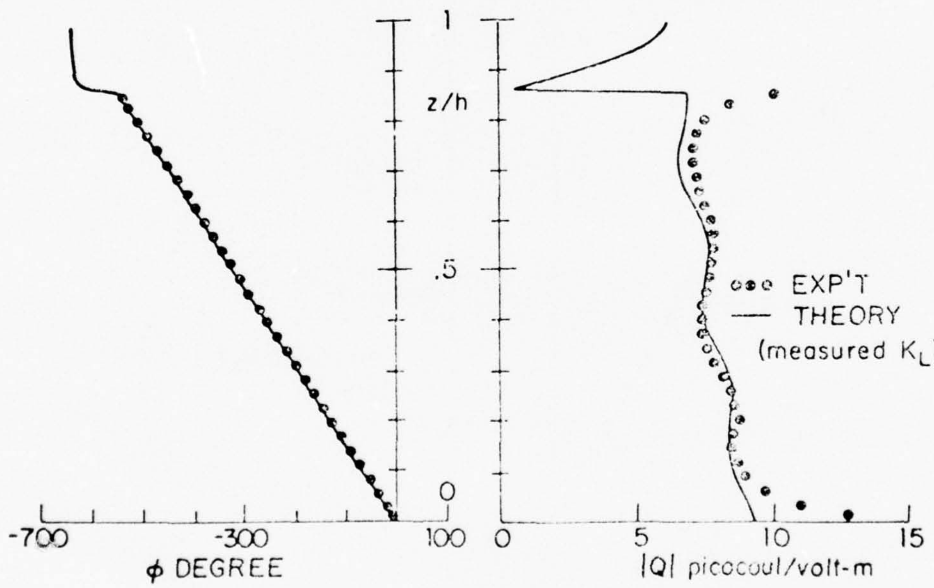


FIG. 3.131. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.132. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; ℓ_1/λ_0 = 1.5 AND d/λ_0 = .29.

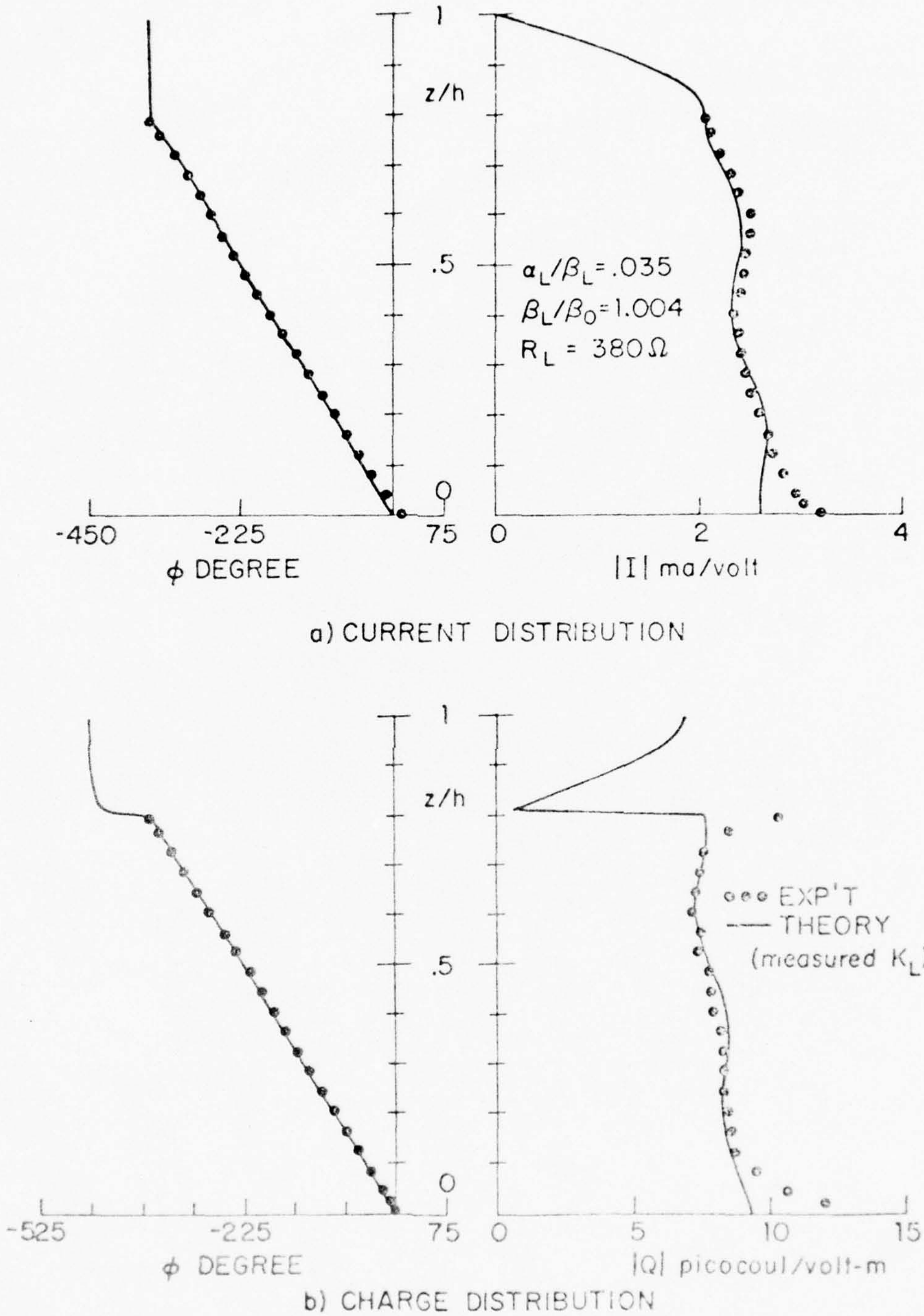


FIG. 3.133. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\ell_1/\lambda_0 = 1$ AND $d/\lambda_0 = .29$.

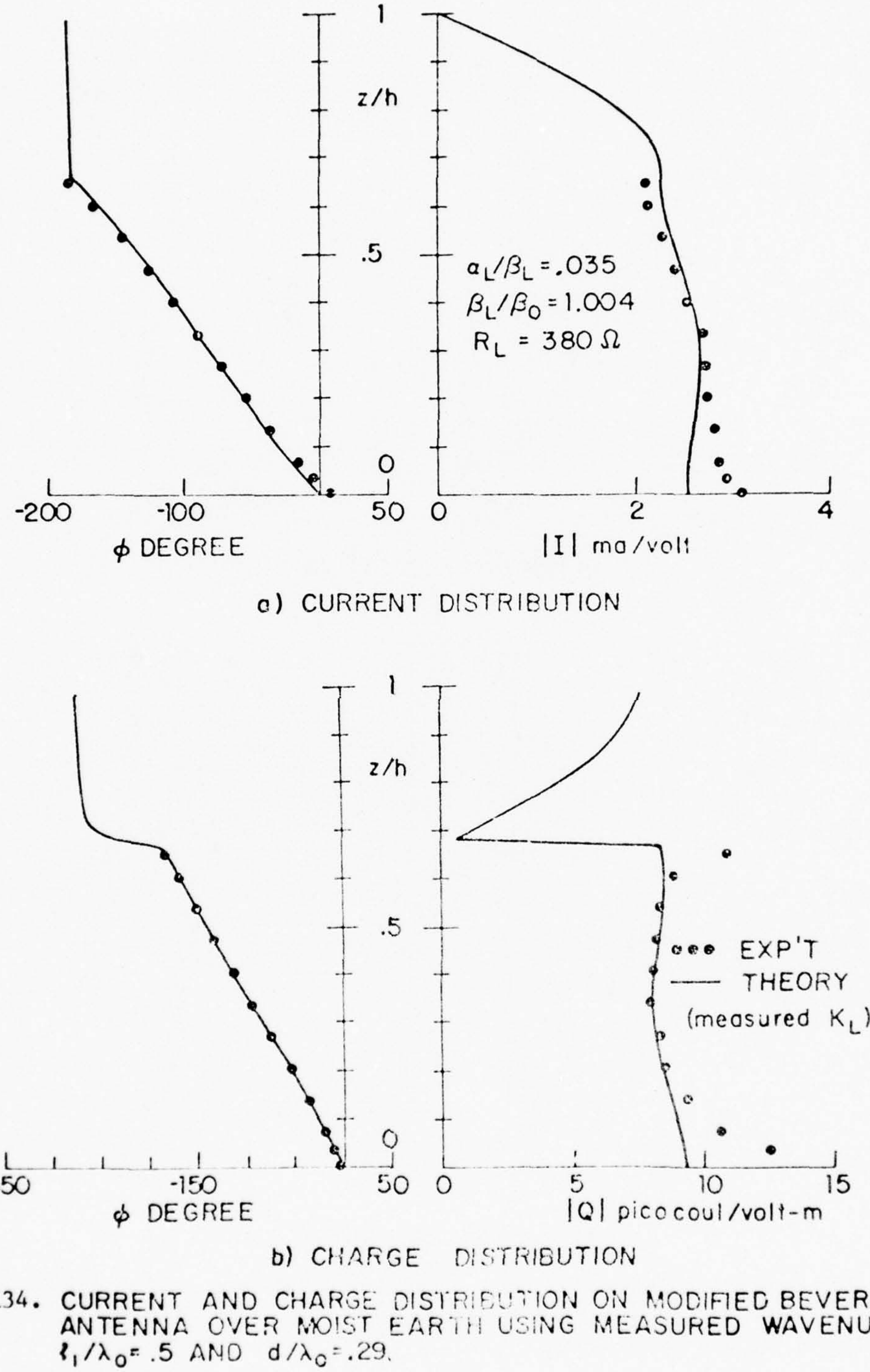


FIG. 3.134. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; ℓ_1/λ_0= .5 AND d/λ_0=.29.

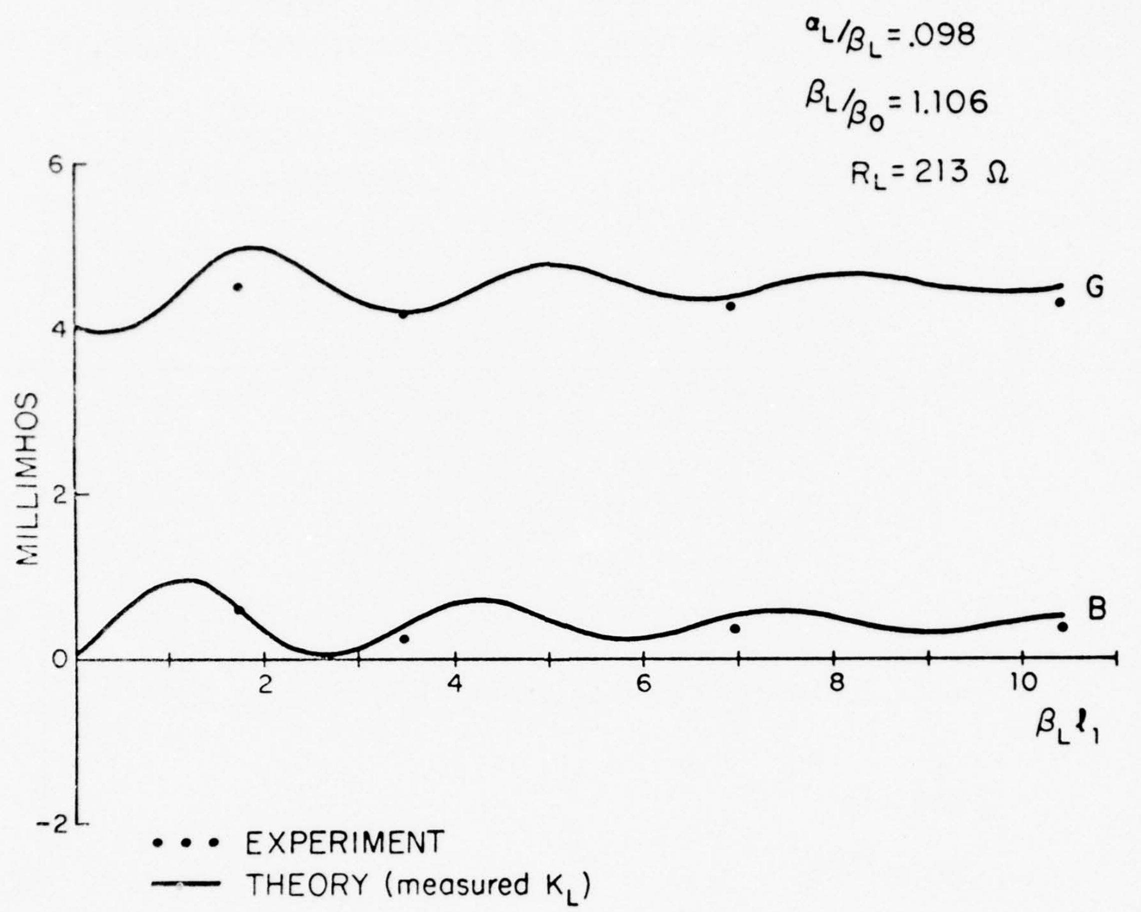


FIG. 3.135. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L, $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

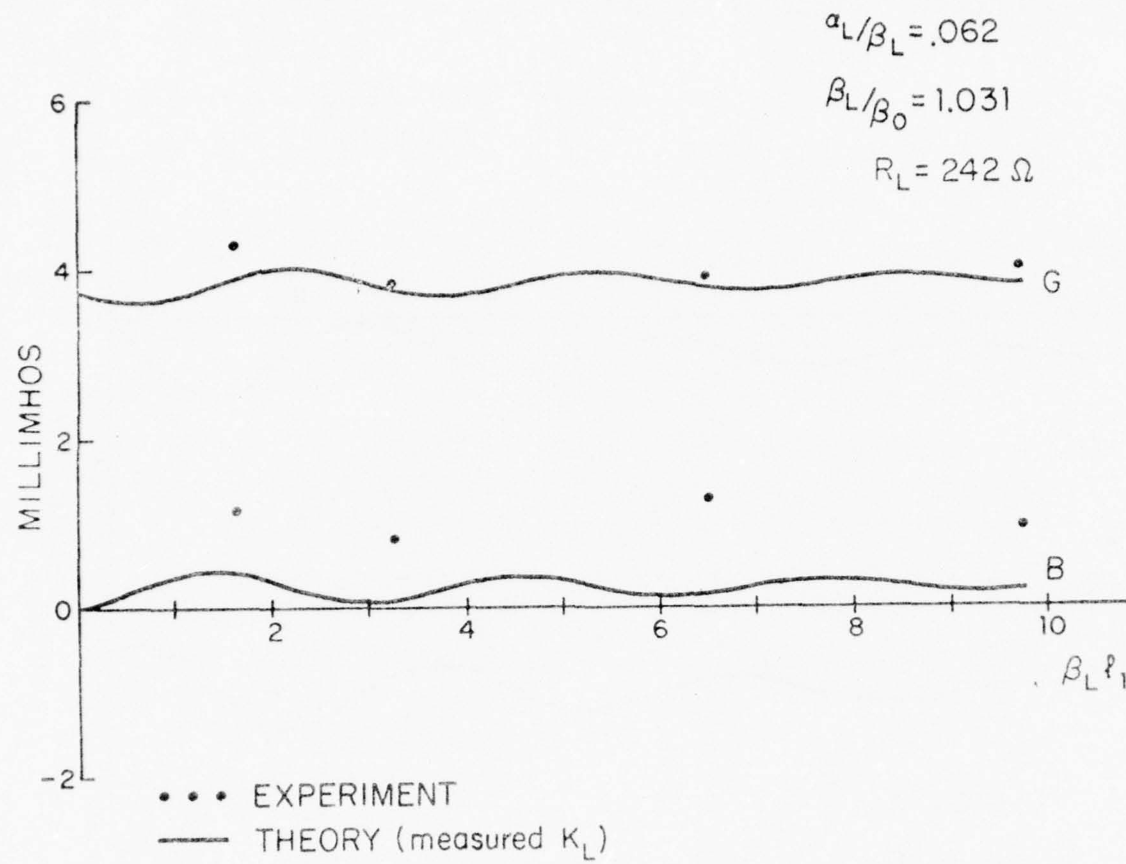


FIG. 3.136. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L, $d/\lambda_o = .05$ AND $a/\lambda_o = .0015$

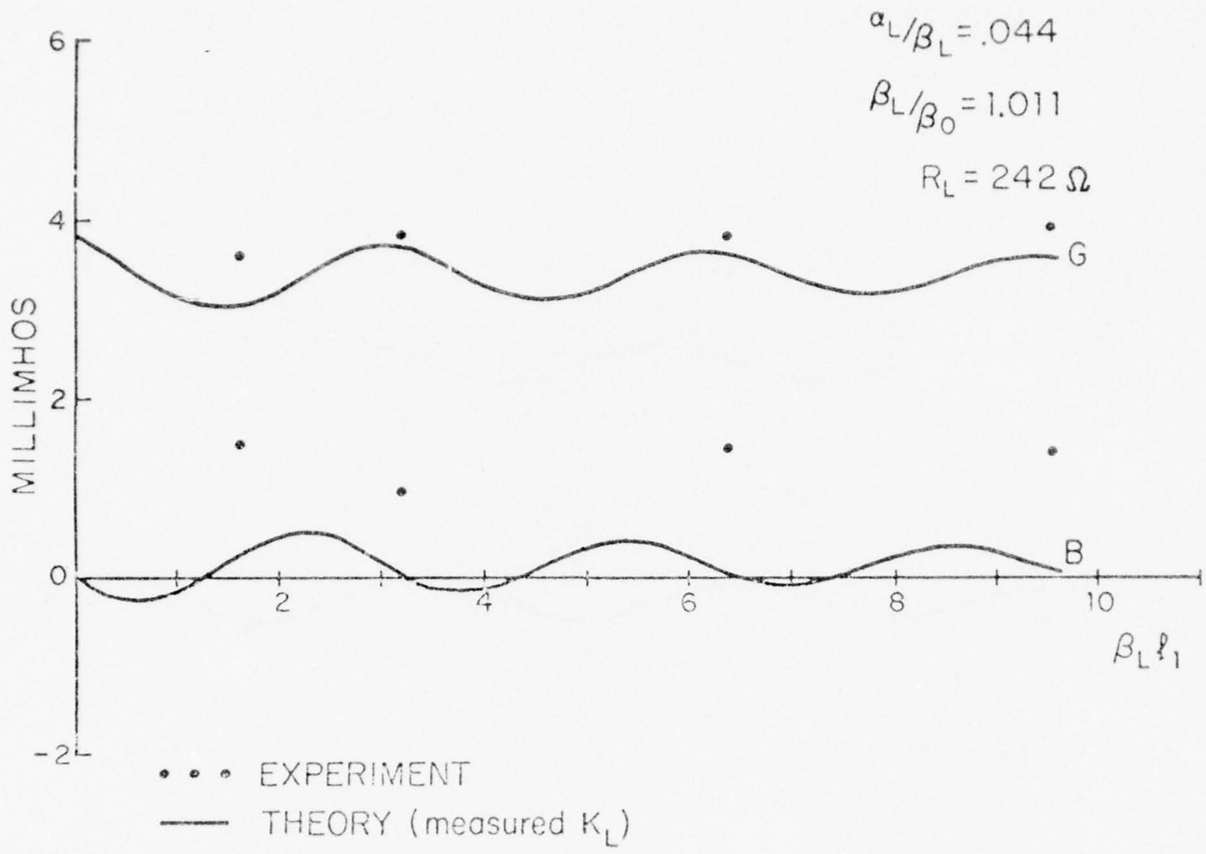


FIG. 3.137. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L, $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$.

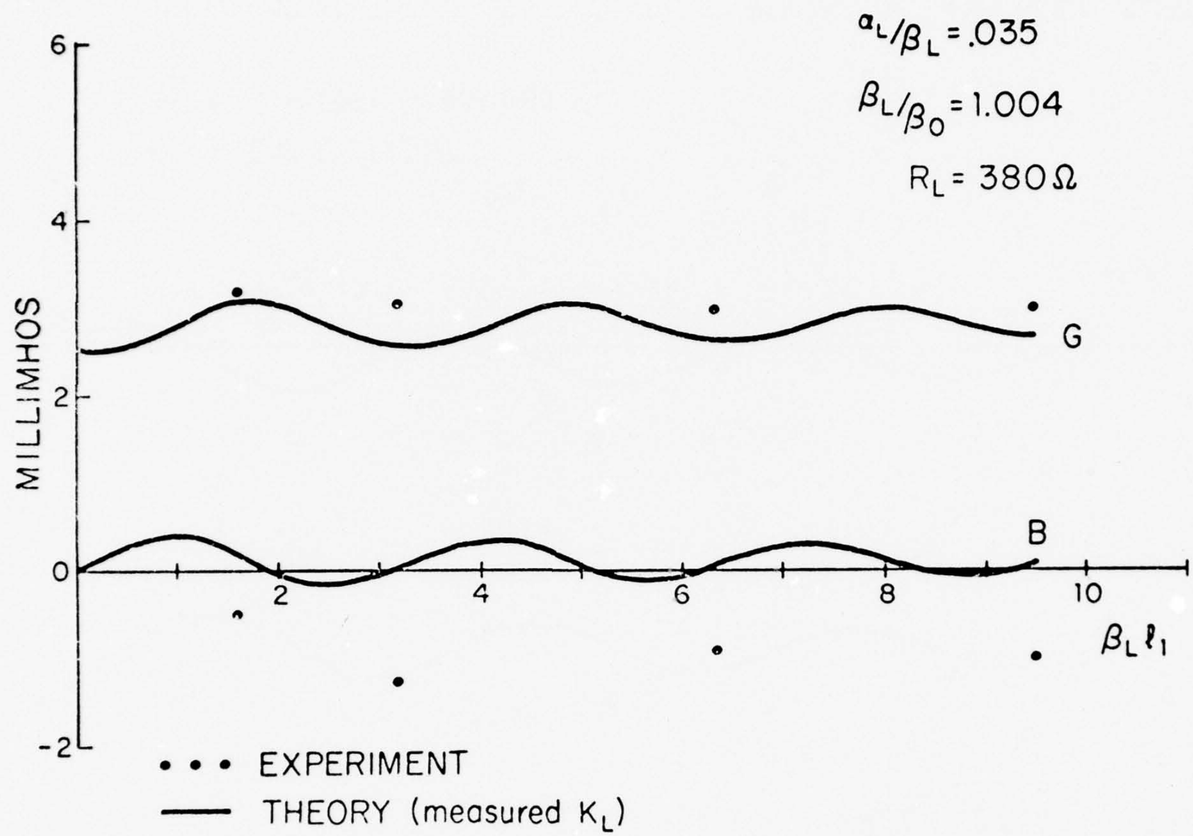


FIG. 3.138. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L, $d/\lambda_0 = .29$ AND $a/\lambda_0 = .0015$.

3.5. End-Effect Correction

It was pointed out previously that the antenna end effect [6] is responsible for both the shift that appears in the experimental results when compared with the theoretical current and charge distribution curves and the discrepancies which occur between the theoretical and measured α_L. The shift is most noticeable at heights of d/λ_0 = .05, .1, and .25, suggesting the range of heights at which the end effect becomes important. This is further confirmed when it is observed that it is within this range that the measured α_L departs significantly from the theoretical values. Since antennas of the type being discussed behave like transmission lines, the end-effect phenomenon associated with transmission lines is also prevalent for this type of antenna. In transmission-line theory an ideal open circuit possesses an infinite impedance in the plane of the open circuit. In practical situations, however, an open connection such as the condition that would exist at the end of the antenna would not represent an ideal open circuit due to the fact that the capacitance per unit length near the end of the line would no longer be constant. To correct for this, a lumped capacitance C_T is evaluated which represents the effect of the terminal zone where both the wave number and capacitance per unit length become functions of the distance from the end of the line. The effect of the terminal-zone capacitance is to cause a large charge build-up at the end of the antenna, as can be easily seen from the previous curves, causing both the current and charge distributions to deviate from their sinusoidal behavior at the end of the line. It can be shown [4] that the effect of the terminal zone is to cause an increase in the effective length of the transmission line that is equivalent to C_T/C_0 where C_0 is the capacitance per unit length for the infinitely long line. This increase in effective length is the reason for the shift observed in the measured data when compared with the theoretical curves. The zeroth-order transmission-line theory is unable to account accurately for this end effect and the corresponding increase in effective length. The fact that all the energy which arrives at the end of the antenna may not be completely reflected will cause the discrepancies seen in the attenuation. This radiation loss off the end of the antenna introduces a resistance which is included with the end-correction capacitance C_T in the terminal network that models the end effect.

To correct for the shift due to the end effect, it is possible to evaluate the apparent increase in length caused by the open-circuited end and to add this increase to the actual antenna length. Using this new length in either the complete theoretical formulation, Eqs. (1.6), (1.18), (1.54) and (1.56), or in the semi-empirical approach which utilizes the above equations with measured wave numbers, will correct for the deviation that occurs between the measured data and both analytic solutions. This increase in length can be obtained experimentally from the curves in Sections 3.3 and 3.4. Since the end effect should not be dependent on the antenna length, the $h/\lambda_0 = 1$ curve was used for all heights over all three media to determine this increase. This was done by measuring the difference between the null of the data and the null of the theory being compared. The following increases were measured:

d/λ_0	Fresh Water	Salt Water	Moist Earth
.01	0	0	0
.02	0	1.6 cm	0
.05	2 cm	2 cm	2 cm
.1	2.4 cm	2 cm	2.4 cm
.25	3.2 cm	2.8 cm	3.2 cm

For the lowest heights, where the attenuation is highest, no noticeable increase in length was observed from the curves. As the height of the wire is increased, there is a corresponding increase in the apparent length of the wire ranging up to approximately 3 cm. This additional length can be included to obtain a first-order correction for the end effect.

The complex reflection coefficient at the end of a dipole antenna placed above a dissipative half-space is an intricate theoretical problem which has yet to be solved. From this quantity the ρ_s and Φ_s values which describe the end effect can be obtained. The ρ_s value is associated with the radiation loss from the end of the antenna.

A more complete theory for the current and charge distributions is presented in Section 1.8 of Volume I. It includes contributions due to empirically determined end effects and uses the theoretical k_L determined by King.

3.6. Broadband Characteristics of the Modified Beverage Antenna

One of the more desirable properties of the conventional Beverage antenna is its proposed frequency-independent characteristics. A careful study, however, shows that there has never been a definitive investigation into the frequency response of the conventional Beverage antenna. It has been assumed that when the antenna is in the traveling-wave mode, its frequency-independent nature is evident. It was shown previously that the characteristic impedance of the wire is dependent on the d/λ_0 value which depends in turn on the operating frequency. Changes in the frequency may cause varying degrees of mismatch. The original Beverage antenna work also left unanswered what the frequency response would be of the counterpoise system and the vertical elements at the end of the antenna.

For the modified Beverage antenna the necessity of the quarter-wave terminating section appears to limit seriously its anticipated broadband behavior. It can be shown, however, that despite the use of the quarter-wave section a broadband response can be obtained over a wide range of parameters. Altshuler [2] has shown that for a similar type of traveling-wave antenna in free space, excellent frequency response can be obtained over a 2-to-1 range with additional adequate coverage occurring over a 3-to-1 range. Considering the similarity in configuration, frequency responses at least as good can be anticipated for the modified Beverage antenna. The presence of significant attenuation due to interaction with the half-space will make the Beverage antenna less susceptable at the driving point to changes at the end of the antenna.

Two sets of measurements were made to determine the broadband properties of the modified Beverage antenna. The series of curves presented in the previous sections (Figs. 3.96 - 3.100, 3.118 - 3.122, and 3.135 - 3.138) show that the match for a particular frequency is quite good over all ranges of the length ℓ_1. A second set of measurements was taken in which the length ℓ_1 was kept constant while the length ℓ_2 of the quarter-wave section was varied. The frequency was kept constant at 300 MHz. The input admittance for this situation is presented as a function of the length of the terminating section in Fig. 3.139. The input admittance remains fairly constant over at least a 3-to-1 range, confirming the broadband nature of this antenna. With the expanded ordinate scale in Fig. 3.139 it can be seen that

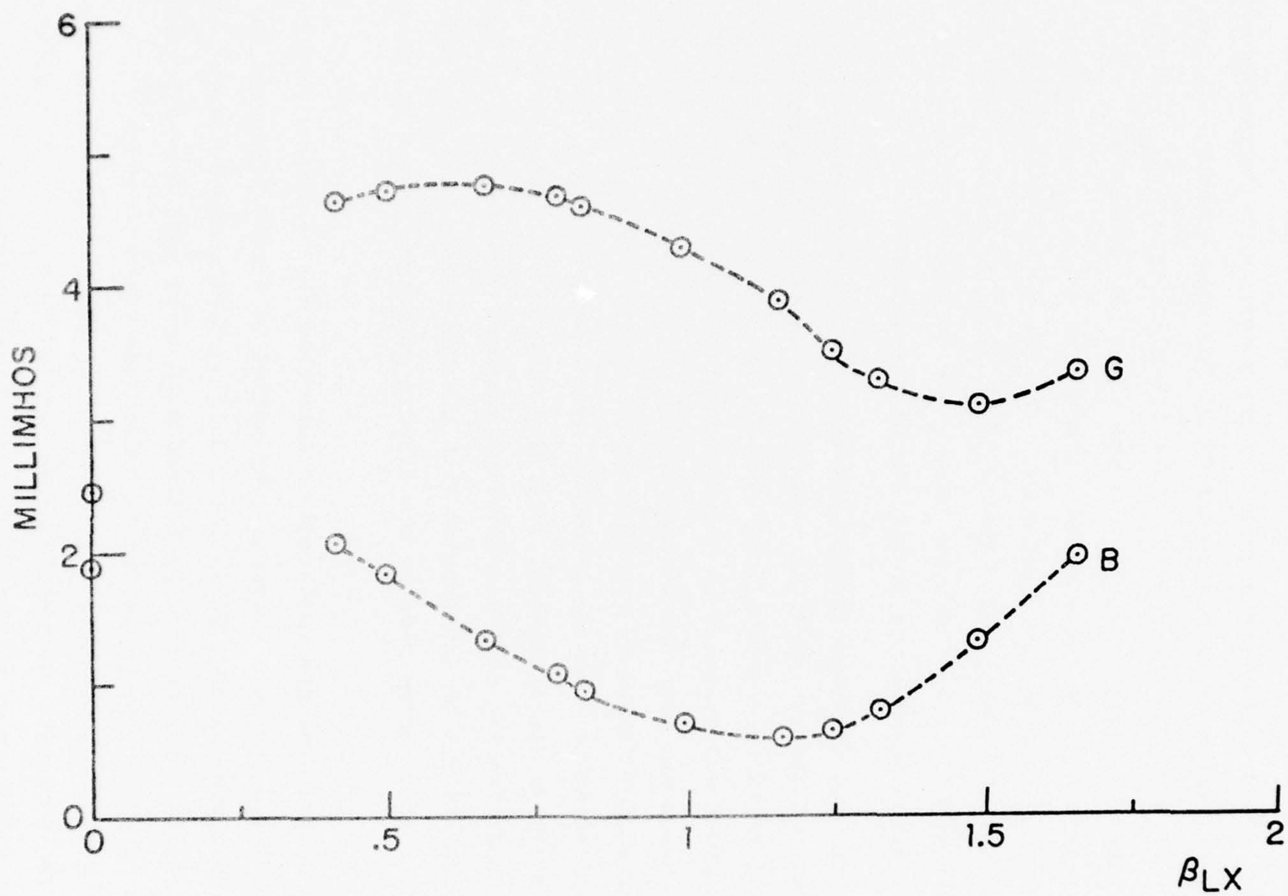


FIG. 3.139. INPUT ADMITTANCE OF BEVERAGE ANTENNA FOR VARIOUS LENGTHS OF TERMINATING SECTION; $\lambda_1/\lambda_0 = 1$, $d/\lambda_0 = .025$, AND $R_L = 220\Omega$.

the maximum variation in conductance or susceptance is approximately 1.5 millimhos.

3.7. Conclusions

The data presented in Figs. 3.2 through 3.138 lead to numerous conclusions concerning the properties of both dipole antennas in the presence of a dissipative medium and Beverage wave antennas. The conclusions derived from this experimental analysis are as follows:

<u>Dense Media</u> $|k_2| >> |k_1|$

This case applies to the measurements made over both fresh and salt water at 300 MHz with $\epsilon_r \approx 81$. The dense-medium condition, Eq. (1.3b), was one of the restrictions originally imposed in the development of the expression for the wave number on a horizontal wire above a dissipative half-space. For horizontal wires including Beverage antennas placed above this type of medium, the following can be concluded:

1) For $d/\lambda_0 \leq .02$, the theoretical development of King, described in Section 1.2 of Volume I, correctly represents the current and charge distributions and provides a good zeroth-order approximation for the input admittance on a center-driven dipole antenna. The extension of this theory to loaded antennas, given in Section 1.6, which includes the special case of the Beverage wave antenna, also gives correct results for the current, charge and input admittance. The agreement in this range of heights is mainly a result of the fact that the theoretical wave number given by (1.7) agrees quite favorably with the experimentally determined wave numbers.

2) In the range $.02 < d/\lambda_0 \leq .1$, the comparisons between the measured effective and the theoretically predicted wave numbers begin to show the existence of significant deviations. For these heights, variations of 20% or greater begin to occur, especially for the attenuation constant α_L of the antenna. This departure may be due to one of the following factors. Initially it was thought that the transmission-line behavior may no longer be valid for $d/\lambda_0 \geq .02$. This would probably be due to a significant amount of radiation being neglected by the assumption that the radiation into the air is quite small in comparison with the radiation into the half-space. The second possibility, and the more probable one, is that a more refined theory is needed which accounts for the nonideal end effect of the antenna. This

would assume that the theoretical k_L is the correct one and that the discrepancies observed in the wave numbers were due to the absence of an end-correction factor. End effects are dealt with in more detail in Section 1.8 of Volume I. Despite these facts, the measurements have shown that the expressions for the current, charge and admittance [Eqs. (1.6), (1.16), (1.18), (1.54), (1.55), and (1.56)] still hold if the effective wave number is used. Using these equations with the measured effective wave number substituted for k_L gives good agreement with the measured data. The only noticeable departure from this occurs in the admittance where agreement at the first resonance is somewhat in error. Since the theory consists of only a zeroth-order expression, higher-order correction terms due to junction and end effects would be necessary to improve the agreement. Hence, over this range of heights the approximate solution which utilizes the zeroth-order expressions for the current, charge and admittance along with the measured effective wave number gives good results.

3) At $d/\lambda_0 = .25$ measurements show a perceptible departure from the zeroth-order form for all three quantities along with significant deviations in the wave number. It is important to note that in the range $.1 < d/\lambda_0 < .25$, no measurements were taken and, therefore, it has not been determined exactly where in this range the current, charge and admittance change from a basically transmission-line form to one more characteristic of an antenna in free space. It has been shown that at $d/\lambda_0 = .25$ the transmission-line form with the measured wave number gives adequate agreement for the current and charge distributions, although it is evident that the measurements are not exactly sinusoidal. It may still be possible that with a large enough end correction one may obtain an adequate approximation at this height. Larger discrepancies appear, however, for the input admittance which is quite sensitive to the exact form of the current distribution. For the Beverage antenna the comparisons at this height tend to provide much better results.

Hence, for antennas placed above dense media for which the condition $|k_2| >> |k_1|$ holds, complete theoretical formulations are available for $d/\lambda_0 \leq .02$. For heights ranging from $d/\lambda_0 > .02$ up to at least $d/\lambda_0 = .1$ and probably higher, the transmission-line characteristics of the wire are still predominant, yet use of measured effective wave numbers for k_L is necessary. If moderate errors can be tolerated, the transmission-line form can be used for the current and charge distributions up to $d/\lambda_0 = .25$.

Discrepancies in the admittance preclude using a simple zeroth-order theory which does not include an end-correction term.

Moderately Dense Media $|k_2| > |k_1|$

This case refers to the measurements that were made over moist earth at 300 MHz where the relative dielectric constant was measured to be $\varepsilon_r = 11.4$ and the conductivity was quite small. This is an interesting case since earth is a more common environment for antennas of this type. These measurements also give an indication as to how restrictive condition (1.3b) actually is. The measurements show that for horizontal-wire antennas as well as Beverage antennas placed above moist earth, the following can be concluded:

1) For the closest spacing measured, $d/\lambda_0 = .02$, a large discrepancy was observed between the theoretical wave number given by (1.7) and the measured one. A significant error was observed in the attenuation constant in that the predicted α_L value was 50% greater than the measured effective α_L value. Despite this fact, the transmission-line-like behavior for the current, charge and input admittance is clearly evident and the comparison with the semi-empirical solutions bears this out. Since measurements made at this height agreed quite well with theory for the dense media case, $|k_2| >> |k_1|$, it would appear that condition (1.3b) must be strictly adhered to for King's theory to be valid.

2) Over the range $.02 < d/\lambda_0 \leq .1$, the zeroth-order transmission-line form is applicable and agreement with the semi-empirical solution is quite good. The error involved in the theoretical wave number remains quite large at these heights. Note that the range over which the transmission-line type behavior predominates most likely extends beyond $d/\lambda_0 = .1$. Since deviations from this behavior occur at the next height measured, $d/\lambda_0 = .29$, it is safe to assume that the semi-empirical solution will be applicable over part of the range $.1 < d/\lambda_0 \leq .29$. This is expecially true for the current and charge distributions and less so for the input admittance. Formulas which would correctly predict the wave numbers for heights up to $d/\lambda_0 = .29$ have not been developed. Note that in this range part of the reason for the discrepancies in the wave numbers may be due to end effects. But, since the error for $d/\lambda_0 = .02$ is so large, it is more than likely that the main cause is the violation of condition (1.3b).

3) As for the case when $|k_2| >> |k_1|$, the currents, charges and admittances begin to depart from the transmission-line behavior at $d/\lambda_0 = .29$ and take on antenna-type characteristics. Current and charge distributions can still be reasonably approximated by semi-empirical procedures but not the admittance which exhibits large errors when using this approximate technique.

Therefore, for antennas above moderately dense media for which $|k_2| > |k_1|$, a completely theoretical formulation does not exist for any range of heights. A transmission-line form, however, can clearly be used with the measured effective wave number to represent the antenna properties accurately for heights at least as great as $d/\lambda_0 = .1$ and up to $d/\lambda_0 = .29$ if large errors can be tolerated.

It is interesting to note that, although $|k_2| > |k_1|$ for moist earth at 300 MHz, at much lower frequencies where $p_e = \sigma/\omega\epsilon$ becomes increasingly larger and the earth acts more like a conductor, the condition $|k_2| >> |k_1|$ can be obtained for moist earth. Under these conditions, one can expect that King's theory will hold in a manner analogous to the water cases. At these lower frequencies, water will also begin to act like a good conductor, which further reinforces the condition that $|k_2| >> |k_1|$ and results in a set of conclusions similar to the case of 300 MHz.

APPENDIX A

COMPUTER PROGRAM FOR EVALUATION OF THE COMPLEX WAVE NUMBER ON A WIRE ABOVE A DISSIPATIVE HALF-SPACE

The program in this appendix evaluates equation (1.7) which gives the complex wave number on a wire over a dissipative half-space. In the main program the operating frequency, wire spacing, radius of the wire, dielectric constant of the half-space, and conductivity of the half-space are read in on data cards. The following function subroutines and subroutines are used:

FUNCTION XK4 - Evaluates the complex wave number of the dissipative half-space.

FUNCTION DGAMMA - Evaluates the Gamma Function of the given argument.

SUBROUTINE BSLSML - Evaluates Bessel Functions J_0 and J_1 of complex arguments.

SUBROUTINE BESH - Evaluates the Hankel Function with complex argument.

TABLE 3.1

```
      COMPLEX XK4,Z,ZX,XK1,XI1,XZ,XU,JBES,YBES,XKL,RC,XKL1
      COMPLEX SUM(60)
      COMPLEX XY8
      COMPLEX XZ1
      COMPLEX XILR,XILR1,XILI
      COMMON ER
      DIMENSION BETA(50),ALPHA(50),RATIO1(50),RATIO2(50),RATIO3(50),
     1RATIO4(50),RRC(50),XIRC(50),DOVLAM(50)
      PI=3.14159265
      READ(5,1) NSET,NC
    1 FORMAT(2I4)
      DO 20 J=1,NSET
      READ(5,100) F,SIGMA,ER,A
  100 FORMAT(4E14.6)
      OMEGA= 2.*PI*F*(10.**6)
      PE= (SIGMA)/((OMEGA)*(ER)*(8.854E-12))
      X1= OMEGA/(3.E8)
      XLAMDA= (2.*PI)/X1
      ZETA = 376.7
      DO 10 I=1,NC
      READ(5,11) D
   11 FORMAT(E14.6)
      Z= 2.*(XK4(SIGMA,OMEGA)*D)
      IF(CABS(Z).GT.9.) GOTO 8
      ZX= CMPLX(0.,1.)*Z
      CALL BSLSML(1,ZX,JBES)
      ZX=CMPLX(0.,1.)*Z
      CALL BESH(ZX,1,1,XY8,IER)
      ZX=CMPLX(0.,1.)*Z
      XK1= -(PI/2.)*XY8
      XI1= -CMPLX(0.,1.)*JBES
      XZ= -(XK1/Z)
      XZ1 = PI*(XI1/(2.*Z))
      DO 30 JJ= 1,21
      SUM(1)= XZ1
      N=JJ-1
      G= (4**N)*DGAMMA(FLOAT(N)+1.5)*DGAMMA(FLOAT(N)+2.5)
      SUM(N+2) = SUM(N+1) -(PI/8.)*((Z**((2*N)+1))/G)
      IF(CABS((SUM(N+2)-SUM(N+1))/SUM(N+1)) .LT. 1.E-5) GOTO 31
   30 CONTINUE
   31 XU = (1./(Z**2))+CMPLX(0.,1.)*SUM(N+2)
      AR = D/A
      ACOSH = ALOG(AR+SQRT((AR**2)-1.))
      XKL= X1*(CSQRT(1.+(2./(ACOSH))*(XU+XZ)))
      GOTO 9
    8 AR=D/A
      ACOSH = ALOG(AR+SQRT((AR**2)-1.))
      XILR= (1./Z)*(CSQRT(PI/(2.*Z)))*CEXP(-Z)
      XILR1 = (1./(Z**2))-XILR*(1.+(3./(8.*Z))-(15./(128.*(Z**3)))+(
     1315./(3072.*(Z**5)))-(10080./(98304.*(Z**7))))
      XILI= (1./Z)*(1.-(1./(Z**2))-(3./(Z**4))-(45./(Z**6))-(1575./(Z
     1**8)))
      XKL=X1*(CSQRT(1.+(2./(ACOSH))*(XILR1+(0.,1.)*XILI)))
    9 XKL1=CONJG(XKL)
      BETA(I) = REAL(XKL1)
      ALPHA(I) = AIMAG(XKL1)
      RATIO1(I) = ALPHA(I)/BETA(I)
      RATIO2(I) = BETA(I)/X1
      RC = ((XKL1*ZETA)/(2.*PI*X1))*ACOSH
      RRC(I) = REAL(RC)
      XIRC(I) = AIMAG(RC)
      RATIO3(I) = RRC(I)/ZETA
      RATIO4(I) = XIRC(I) /ZETA
      DOVLAM(I) = D/XLAMDA
   10 CONTINUE
      WRITE(6,900) J
  900 FORMAT(1H1,//,40X,'PROPERTIES OF WAVE ANTENNA NEAR',/,44X,
     1'DISSIPATIVE HALF SPACE',///,10X,'SET NUMBER = ',5X,I2,//)
      WRITE(6,901) SIGMA,ER,PE
  901 FORMAT(10X,'CONSTITUTIVE PARAMETERS OF DISSIPATIVE MEDIA',/,
     2 25X,'SIGMA = ',F6.5,10X,'ER = ',F7.4,10X,'PE = ',F6.4,//)
      WRITE(6,902) F
  902 FORMAT(40X,'FREQUENCY = ', F6.2,'MHZ',///)
      WRITE(6,903) (DOVLAM(I),BETA(I),ALPHA(I),RATIO2(I),RATIO1(I),
     1RRC(I),XIRC(I),RATIO3(I),RATIO4(I) ,I=1,NC)
  903 FORMAT(8X,'D/LAM',9X,'BETA',8X,'ALPHA',7X,'B1/BC',8X,'AL/BO',10X,
     1'RC',7X,'XC',4X,'RC/ZETA',6X,'XC/ZETA' ,///, 50(5X,F8.4,8X,F7.4,8X,
     2F7.4,6X,F5.3,8X,F5.3,8X,F6.2,3X,F6.2,3X,F5.3,8X,F5.3,/))
   20 CONTINUE
C        THIS PART OF THE PROGRAM EVALUATES THE COMPLEX
C        WAVE NUMBER FOR A HOROZONTAL ANTENNA OVER A DISSIPATIVE
C        HALF-SPACE GIVEN THE NECESSARY SET OF PARAMETERS. THE
C        FORMULA FOLLOWS THE DEVELOPMENT IN KING|S PAPER. ALSO
C        EVALUATED IS THE CHARACTERISTIC IMPEDENCE FOR THE SPECIFIED
C        WAVE NUMBER. THIS ASSUMES +IWT TIME DEPENDENCE
      STOP
      END
```

```
      FUNCTION  XK4( SIGMA, OMEGA)
      COMMON ER
      COMPLEX XK4
      H= SIGMA/((OMEGA*ER)*8.86E-12)
      FH= SQRT(.5*(SQRT(1.+(H**2))+1.))
      GH= SQRT(.5*(SQRT(1.+(H**2))-1.))
      BO= OMEGA/(3.E8)
      XK41= BO*FH*SQRT(ER)
      XK42= BO*GH*SQRT(ER)
      XK4= CMPLX(XK41,XK42)
      RETURN
      END
```

TABLE 3.1 (CONTINUED)

```
      FUNCTION DGAMMA(DX)
      XX=DX
      IF(XX-57.)6,6,4
    4 IER=2
      DGAMMA=1.E75
      RETURN
    6 X=XX
      ERR=1.0E-6
      IER=0
      DGAMMA=1.0
      IF(X-2.0)50,50,15
   10 IF(X-2.0)110,110,15
   15 X=X-1.0
      DGAMMA=DGAMMA*X
      GO TO 10
   50 IF(X-1.0)60,120,110
   60 IF(X-ERR)62,62,80
   62 Y=FLOAT(INT(X))-X
      IF(ABS(Y)-ERR)130,130,64
   64 IF(1.0-Y-ERR)130,130,70
   70 IF(X-1.0)80,80,110
   80 DGAMMA=DGAMMA/X
      X=X+1.0
      GO TO 70
  110 Y=X-1.0
      GY=1.0+Y*(-0.5771017+Y*(+0.9858540+Y*(-0.8764218+Y*(+0.8328212+
     1Y*(-0.5684729+Y*(+0.2548205+Y*(-0.0514993)))))))
      DGAMMA=DGAMMA*GY
  120 RETURN
  130 IER=1
      RETURN
      END
```

```
          SUBROUTINE  BSLSML(NORD,DZZ,DCBSLJ)
C   SUBROUTINE 'BSLSML'
C   'BSLSML'  COMPUTES BESSEL  J FUNCTION WITH COMPLEX ARGUMENTS
C   AND ORDERO AND 1. ACCURACY UPTO 6TH DECIMAL PLACE OR MORE IS
C   OBTAINED FOR ABS(Z) LESS THAN 20.
C         SUBROUTINE DESTROYS ITS INPUT VALUES
          IMPLICIT COMPLEX*8(D), REAL*4(T)
          N=NORD
          TX=REAL(DZZ)
          TY=AIMAG(DZZ)
          X=TX
          Y=TY
          TX=0.5D0*TX
          TY=0.5D0*TY
          TR=TX*TX-TY*TY
          TE=2.D0*TX*TY
          R=N
          ETC=10.0
          L=(SQRT(R*R+10.0*(X*X+Y*Y))-R)+ETC
          TFR=1.D0
          TFI=0.D0
          II=(L+1)*(N+L+1)
          JJ=-(2*L+N+2)
          DO 400 K=1,L
          TP=II+(JJ+K)*K
          TGR=TR/TP
          TGI=TE/TP
          TD=TFR
          TFR=1.D0-TGR*TFR+TGI*TFI
     400  TFI=-(TGR*TFI+TGI*TD)
          IF (N.EQ.0) GO TO 401
          IF (N.GT.0) GO TO 402
     401  CONTINUE
          DCBSLJ=DCMPLX(TFR,TFI)
          RETURN
     402  TGR=1.D0
          TGI=0.D0
          NN=N
     403  TC=TGR
          TGR=TGR*TX-TGI*TY
          TGI=TC*TY+TGI*TX
          NN=NN-1
          IF (NN.GT.0) GO TO 403
          TN=1.D0
          DO 404 MN=1,N
          WMD=MN
     404  TN=TN*WMD
          TGR=TGR/TN
          TGI=TGI/TN
          TD=TFR
          TFR=TFR*TGR-TFI*TGI
          TFI=TD*TGI+TFI*TGR
          GO TO 401
          END
```

TABLE 3.1 (CONTINUED)

```
      FUNCTION DGAMMA(DX)
      XX=DX
      IF(XX-57.)6,6,4
    4 IER=2
      DGAMMA=1.E75
      RETURN
    6 X=XX
      ERR=1.0E-6
      IER=0
      DGAMMA=1.0
      IF(X-2.0)50,50,15
   10 IF(X-2.0)110,110,15
   15 X=X-1.0
      DGAMMA=DGAMMA*X
      GO TO 10
   50 IF(X-1.0)60,120,110
   60 IF(X-ERR)62,62,80
   62 Y=FLOAT(INT(X))-X
      IF(ABS(Y)-ERR)130,130,64
   64 IF(1.0-Y-ERR)130,130,70
   70 IF(X-1.0)80,80,110
   80 DGAMMA=DGAMMA/X
      X=X+1.0
      GO TO 70
  110 Y=X-1.0
      GY=1.0+Y*(-0.5771017+Y*(+0.9858540+Y*(-0.8764218+Y*(+0.8328212+
     1Y*(-0.5684729+Y*(+0.2548205+Y*(-0.0514993)))))))
      DGAMMA=DGAMMA*GY
  120 RETURN
  130 IER=1
      RETURN
      END
```

```
         SUBROUTINE  BSLSML(NORD,DZZ,DCBSLJ)
C     SUBROUTINE 'BSLSML'
C     'BSLSML'  COMPUTES BESSEL  J FUNCTION WITH COMPLEX ARGUMENTS
C     AND ORDERO AND 1. ACCURACY UPTO 6TH DECIMAL PLACE OR MORE IS
C     OBTAINED FOR ABS(Z) LESS THAN 20.
C        SUBROUTINE DESTROYS ITS INPUT VALUES
         IMPLICIT COMPLEX*8(D), REAL*4(T)
         N=NORD
         TX=REAL(DZZ)
         TY=AIMAG(DZZ)
         X=TX
         Y=TY
         TX=0.5D0*TX
         TY=0.5D0*TY
         TR=TX*TX-TY*TY
         TE=2.D0*TX*TY
         R=N
         ETC=10.0
         L=(SQRT(R*R+10.0*(X*X+Y*Y))-R)+ETC
         TFR=1.D0
         TFI=0.D0
         II=(L+1)*(N+L+1)
         JJ=-(2*L+N+2)
         DO 400 K=1,L
         TP=II+(JJ+K)*K
         TGR=TR/TP
         TGI=TE/TP
         TD=TFR
         TFR=1.D0-TGR*TFR+TGI*TFI
  400    TFI=-(TGR*TFI+TGI*TD)
         IF (N.EQ.0) GO TO 401
         IF (N.GT.0) GO TO 402
  401    CONTINUE
         DCBSLJ=DCMPLX(TFR,TFI)
         RETURN
  402    TGR=1.D0
         TGI=0.D0
         NW=N
  403    TC=TGR
         TGR=TGR*TX-TGI*TY
         TGI=TC*TY+TGI*TX
         NW=NW-1
         IF (NW.GT.0) GO TO 403
         TW=1.D0
         DO 404 MW=1,N
         WMD=MW
  404    TW=TW*WMD
         TGR=TGR/TW
         TGI=TGI/TW
         TD=TFR
         TFR=TFR*TGR-TFI*TGI
         TFI=TD*TGI+TFI*TGR
         GO TO 401
         END
```

TABLE 3.1 (CONTINUED)

```
      SUBROUTINE BESH(ZX,N,KIND,XY0,IER)
C  SUBROUTINE   'BESH'
C  'BESH'  COMPUTES HANKEL FUNCTION WITH COMPLEX ARGUEMENTS.
C     SUBROUTINE DESTROYS ITS INPUT VALUES
       IMPLICIT COMPLEX*16(D)
       IMPLICIT REAL*8(T)
      COMPLEX ZX
      COMPLEX XY0
      DIMENSION DT(12),DTT(6),DTX(6)
      DX=ZX
      IF(N.EQ.0.AND.KIND.EQ.1) GO TO 300
      IF(N.EQ.0.AND.KIND.EQ.2) GO TO 400
      IF(N.EQ.1.AND.KIND.EQ.1) GO TO 300
      IF(N.EQ.1.AND.KIND.EQ.2) GO TO 400
  300 DX=DX*DCMPLX(0.D0,-1.D0)
      GO TO 500
  400 DX=DX*DCMPLX(0.D0,1.D0)
      GO TO 500
  500 TRX=REAL(DX)
      TIX=AIMAG(DX)
      TMAG= SQRT(TRX**2+TIX**2)
      DBK=DCMPLX(0.D0,0.D0)
      TPI=3.14159265
      IF(N) 10,20,20
   10 IER=1
      RETURN
   20 IF (TMAG-170.D0) 22,22,21
   21 IER=3
      RETURN
   22 IER=0
      IF (TMAG-1.D0) 36,36,25
   25 DA= CEXP(-DX)
      DB=1.D0/DX
      DC= CSQRT(DB)
      IF(REAL(DC))100,101,101
  100 DC=-DC
  101 CONTINUE
      DT(1)=DB
      DO 26 L=2,12
   26 DT(L)=DT(L-1)*DB
      DTT(1)=(DX/3.75D0)**2
      DO 600 LL=2,6
  600 DTT(LL)=DTT(LL-1)*DTT(1)
      DTX(1)=(DX/2.D0)**2
      DO 605 LLL=2,6
  605 DTX(LLL)=DTX(LLL-1)*DTX(1)
      IF(N-1) 627,270,627
  627 IF(TMAG-2.00D0) 610,610,27
C     COMPUTE I0 AND THEN K0
  610 DI0=1.D0+3.5156229D0*DTT(1)+3.0899424D0*DTT(2)
     1+1.2067492D0*DTT(3)+.2659732D0*DTT(4)+.0360768D0*DTT(5)
     2+.0045813D0*DTT(6)
      DG0=-CDLOG(DX/2.D0)*DI0-.57721566D0+.42278420D0*DTX(1)
     1+.23069756D0*DTX(2)+.03488590D0*DTX(3)+.00262698D0*DTX(4)
     2+.00010750D0*DTX(5)+.0000074D0*DTX(6)
      IF(N) 20,628,629
  628 DBK=DG0
      GO TO 200
C
C     COMPUTE K0 USING POLYNOMIAL APPROXIMATION                    BESK 060
C
   27 DG0=DA*(1.25331414D0-.15666418D0*DT(1)+.08811278D0*DT(2)
     2-.09139095D0*DT(3)+.13445962D0*DT(4)-.22998503D0*DT(5)
     3+.37924097D0*DT(6)-.52472773D0*DT(7)+.55753684D0*DT(8)
     4-.42626329D0*DT(9)+.21845181D0*DT(10)-.06680977D0*DT(11)
     5+.009189383D0*DT(12))*DC
      IF(N)20,28,29                                                BESK 066
   28 DBK=DG0
      GO TO 200
C     COMPUTE I1 AND THEN K1
  270 IF(TMAG-2.00D0) 629,629,29
  629 DI1=DX*(.5D0+.87890594D0*DTT(1)+.51498869D0*DTT(2)
     1+.15084934D0*DTT(3)+.02658733D0*DTT(4)+.00301532D0*DTT(5)
     2+.00032411D0*DTT(6))
      DG1=CDLOG(DX/2.D0)*DI1+(1.D0/DX)*(1.D0+.15443144D0*DTX(1)
     1-.67278579D0*DTX(2)-.18156897D0*DTX(3)-.01919402D0*DTX(4)
     2-.00110404D0*DTX(5)-.00004686D0*DTX(6))
      IF (N-1) 20,630,31
  630 DBK=DG1
      GO TO 200
C                                                                  BESK 069
C     COMPUTE K1 USING POLYNOMIAL APPROXIMATION                    BESK 070
C                                                                  BESK 071
   29 DG1=DA*(1.2533141D0+.4699927D0*DT(1)-.14685830D0*DT(2)
     2+.12804266D0*DT(3)-.17364316D0*DT(4)+.28476181D0*DT(5)
     3-.45943421D0*DT(6)+.62833807D0*DT(7)-.66322954D0*DT(8)
     4+.50502386D0*DT(9)-.25813038D0*DT(10)+.07880012D0*DT(11)
     5-.010824177D0*DT(12))*DC
      IF(N-1)20,30,31                                              BESK 076
   30 DBK=DG1
      GO TO 200
C                                                                  BESK 079
C     FROM K0,K1 COMPUTE KN USING RECURRENCE RELATION              BESK 080
C                                                                  BESK 081
   31 DO 35 J=2,N                                                  BESK 082
      DGJ=2.D0*(FLOAT(J)-1.D0)*DG1/DX+DG0
      IF( CABS(DGJ)-1.D70) 33,33,32
   32 IER=4                                                        BESK M08
      GO TO 34                                                     BESK M09
   33 DG0=DG1
   35 DG1=DGJ
   34 DBK=DGJ
      GO TO 200
   36 DB=DX/2.D0
      IF (REAL(DB)) 70,71,70
   71 IF (AIMAG(DB)) 72,70,73
   72 TANG=-TPI/2.D0
      GO TO 75
   73 TANG=TPI/2.D0
   75 TABS= CABS(DB)
      TAR=0.57721 6D0+ALOG(TABS)
      DA= CMPLX(TAR,TANG)
      GO TO 76
   70 DA=0.5772156 6D0+ CLOG(DB)
   76 DC=DB*DB
      IF(N-1)37,43,37                                              BESK 091
C                                                                  BESK 092
C     COMPUTE K0 USING SERIES EXPANSION                            BESK 093
C                                                                  BESK 094
```

TABLE 3.1 (CONTINUED)

```
   37 DG0=-DA
      DX2J=DCMPLX(1.D0,0.D0)
      TFACT=1.D0
      THJ=0.D0
      DØ 40 J=1,6                                                BESK 099
      TRJ=1.D0/FLØAT(J)
      DX2J=DX2J*DC
      TFACT=TFACT*TRJ*TRJ
      THJ=THJ+TRJ
   40 DG0=DG0+DX2J*TFACT*(THJ-DA)
      IF(N)43,42,43                                              BESK 105
   42 DBK=DG0
      GØ TØ 200
C                                                                BESK 108
C     CØMPUTE K1 USING SERIES EXPANSIØN                          BESK 109
C                                                                BESK 110
   43 DX2J=DB
      TFACT=1.D0
      THJ=1.D0
      DG1=1.D0/DX+DX2J*(.5D0+DA-THJ)
      DØ 50 J=2,8                                                BESK 115
      DX2J=DX2J*DC
      TRJ=1.D0/FLØAT(J)
      TFACT=TFACT*TRJ*TRJ
      THJ=THJ+TRJ
   50 DG1=DG1+DX2J*TFACT*(.5D0+(DA-THJ)*FLØAT(J))
      IF(N-1)31,52,31                                            BESK 121
  52  DBK=DG1
C
C     CØMPUTE HANKEL FUNCTIØN USING KØ AND K1
C
 200  IF(N.EQ.0.AND.KIND.EQ.1) GØ TØ 110
      IF(N.EQ.0.AND.KIND.EQ.2) GØ TØ 115
      IF(N.EQ.1.AND.KIND.EQ.1) GØ TØ 120
      IF(N.EQ.1.AND.KIND.EQ.2) GØ TØ 120
  110 DBH=-2.D0*DCMPLX(0.D0,1.D0)*DBK/TPI
      GØ TØ 130
  115 DBH=2.D0*DCMPLX(0.D0,1.D0)*DBK/TPI
      GØ TØ 130
 120  DBH=-2.D0*DBK/TPI
      XYØ=DBH
 130  CØNTINUE
      RETURN
      END
```

APPENDIX B

TABLES OF MEASURED CURRENTS, CHARGES AND ADMITTANCES ON UNLOADED MONOPOLES OVER A DISSIPATIVE HALF-SPACE AND ON MODIFIED BEVERAGE ANTENNAS

This appendix contains all the measured data described in Part III. Table 3.2 lists the measured data for the current and charge distributions on unloaded monopoles. The following terms are defined:

$\{{I \atop Q}\}$RMAG = Raw data for current and charge magnitudes.

$\{{I \atop Q}\}$RFAZ = Raw data for current and charge phases.

$\{{I \atop Q}\}$NMAG = Normalized magnitudes for current and charge.

$\{{I \atop Q}\}$NFAZ = Normalized phases for current and charge.

$\{{I \atop Q}\}$NREAL = Normalized real part of current and charge.

$\{{I \atop Q}\}$NIMAG = Normalized imaginary part of current and charge.

The remaining tables list the following data:

Table 3.3. Measured input admittances and impedances of a monopole over dissipative media.

Table 3.4. Measured current and charge distributions on modified Beverage antennas.

Table 3.5. Measured input admittances and impedances of the modified Beverage antenna.

TABLE 3.2

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .1285 BETAL/BETAC = 1.143 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ FE = .067 D/LAMDAO = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	9.993	150.00	6.000	20.00	5.638	2.052	.003
.017	9.767	140.30	5.860	10.30	5.766	1.048	.025
.033	9.391	130.60	5.640	.60	5.640	.059	.050
.050	8.991	120.80	5.400	-9.20	5.331	-.863	.075
.067	8.558	110.20	5.140	-19.80	4.836	-1.741	.100
.083	8.158	99.50	4.900	-30.50	4.222	-2.487	.125
.100	7.759	89.00	4.660	-41.00	3.517	-3.057	.150
.117	7.493	77.60	4.500	-52.40	2.746	-3.565	.175
.133	7.293	65.60	4.380	-64.40	1.893	-3.950	.200
.150	7.159	53.80	4.300	-76.20	1.026	-4.176	.225
.167	7.060	42.20	4.240	-87.80	.163	-4.237	.250
.183	7.093	31.20	4.260	-98.80	-.652	-4.210	.275
.200	7.126	20.50	4.280	-109.50	-1.429	-4.035	.300
.217	7.193	10.60	4.320	-119.40	-2.121	-3.764	.325
.233	7.293	1.10	4.380	-128.90	-2.750	-3.409	.350
.250	7.193	-8.00	4.320	-138.00	-3.210	-2.891	.375
.267	7.193	-19.20	4.320	-149.20	-3.711	-2.212	.400
.283	7.093	-24.70	4.260	-154.70	-3.851	-1.821	.425
.300	6.860	-33.00	4.120	-163.00	-3.940	-1.205	.450
.317	6.493	-41.00	3.900	-171.00	-3.852	-.610	.475
.333	6.360	-56.00	3.820	-186.00	-3.799	.399	.500
.350	5.694	-59.60	3.420	-189.60	-3.372	.570	.525
.367	5.295	-69.70	3.180	-199.70	-2.994	1.072	.550
.383	4.862	-80.60	2.920	-210.60	-2.513	1.486	.575
.400	4.462	-93.90	2.680	-223.90	-1.931	1.858	.600
.417	4.196	-107.60	2.520	-237.60	-1.350	2.128	.625
.433	4.096	-122.00	2.460	-252.00	-.760	2.340	.650
.450	4.096	-137.50	2.460	-267.50	-.107	2.458	.675
.467	4.196	-150.00	2.520	-280.00	.438	2.482	.700
.483	4.462	-162.00	2.680	-292.00	1.004	2.485	.725
.500	4.662	-172.00	2.800	-302.00	1.484	2.375	.750
.517	4.795	-182.00	2.880	-312.00	1.927	2.140	.775
.533	5.095	-188.60	3.060	-318.60	2.295	2.024	.800
.550	5.161	-195.90	3.100	-325.90	2.567	1.738	.825
.567	5.095	-201.00	3.060	-331.00	2.676	1.484	.850
.583	4.995	-207.00	3.000	-337.00	2.762	1.172	.875
.600	4.695	-212.80	2.820	-342.80	2.694	.834	.900
.617	4.362	-218.60	2.620	-348.60	2.568	.518	.925
.633	3.896	-225.40	2.340	-355.40	2.332	.188	.950
.650	3.497	-232.80	2.100	-362.80	2.097	-.103	.975
.667	2.964	-243.00	1.780	-373.00	1.734	-.400	1.000
.683	2.464	-256.00	1.480	-386.00	1.330	-.649	1.025
.700	2.065	-273.80	1.240	-403.80	.895	-.858	1.050
.717	1.931	-297.60	1.160	-427.60	.442	-1.072	1.075
.733	2.065	-322.00	1.240	-452.00	-.043	-1.239	1.100
.750	2.394	-340.00	1.440	-470.00	-.493	-1.353	1.125
.767	2.764	-352.00	1.660	-482.00	-.880	-1.408	1.150
.783	3.263	-361.60	1.960	-491.60	-1.301	-1.466	1.175
.800	3.696	-368.30	2.220	-498.30	-1.658	-1.477	1.200
.817	4.063	-373.00	2.440	-503.00	-1.949	-1.468	1.225
.833	4.262	-377.00	2.560	-507.00	-2.147	-1.394	1.250
.850	4.462	-379.60	2.680	-509.60	-2.312	-1.356	1.275
.867	4.362	-381.30	2.620	-511.30	-2.298	-1.258	1.300
.883	4.262	-383.00	2.560	-513.00	-2.281	-1.162	1.325
.900	3.896	-384.20	2.340	-514.20	-2.107	-1.018	1.350
.917	3.596	-385.50	2.160	-515.50	-1.966	-.896	1.375
.933	3.064	-386.00	1.840	-516.00	-1.681	-.748	1.400
.950	2.394	-387.00	1.440	-517.00	-1.326	-.563	1.425
.967	1.765	-387.50	1.060	-517.50	-.979	-.406	1.450
.983	.999	-387.70	.600	-517.70	-.555	-.228	1.475
.989	.699	-387.50	.420	-517.50	-.388	-.161	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	9.540	-1.20	25.440	-1.20	25.434	-.533	.006
.017	7.950	-10.60	21.200	-10.60	20.838	-3.900	.025
.033	7.455	-21.30	19.880	-21.30	18.522	-7.221	.050
.050	7.357	-31.80	19.620	-31.80	16.675	-10.339	.075
.067	7.305	-42.40	19.480	-42.40	14.385	-13.135	.100
.083	7.207	-52.10	19.220	-52.10	11.807	-15.166	.125
.100	7.102	-60.60	18.940	-60.60	9.298	-16.501	.150
.117	7.102	-69.40	18.940	-69.40	6.664	-17.729	.175
.133	6.907	-78.20	18.420	-78.20	3.767	-18.031	.200
.150	6.810	-87.00	18.160	-87.00	.950	-18.135	.225
.167	6.442	-95.60	17.180	-95.60	-1.676	-17.098	.250
.183	6.112	-104.40	16.300	-104.40	-4.054	-15.788	.275
.200	5.767	-114.00	15.380	-114.00	-6.256	-14.050	.300
.217	5.467	-124.20	14.580	-124.20	-8.195	-12.059	.325
.233	5.220	-135.00	13.920	-135.00	-9.843	-9.843	.350
.250	4.972	-147.20	13.260	-147.20	-11.146	-7.183	.375
.267	4.717	-163.00	12.580	-163.00	-12.030	-3.678	.400
.283	4.620	-172.80	12.320	-172.80	-12.223	-1.544	.425
.300	4.575	-186.20	12.200	-186.20	-12.129	1.318	.450
.317	4.620	-198.50	12.320	-198.50	-11.683	3.909	.475
.333	4.672	-210.00	12.460	-210.00	-10.791	6.230	.500
.350	4.770	-220.70	12.720	-220.70	-9.643	8.295	.525
.367	4.867	-230.00	12.980	-230.00	-8.343	9.943	.550
.383	4.972	-238.70	13.260	-238.70	-6.889	11.330	.575
.400	4.972	-246.60	13.260	-246.60	-5.266	12.169	.600
.417	4.867	-263.60	12.980	-263.60	-1.447	12.899	.625
.433	4.717	-261.00	12.580	-261.00	-1.968	12.425	.650
.450	4.522	-269.00	12.060	-269.00	-.210	12.058	.675
.467	4.222	-276.60	11.260	-276.60	1.294	11.185	.700
.483	3.877	-285.00	10.340	-285.00	2.676	9.988	.725
.500	3.525	-294.40	9.400	-294.40	3.883	8.560	.750
.517	3.082	-305.40	8.220	-305.40	4.762	6.700	.775
.533	2.820	-318.00	7.520	-318.00	5.588	5.032	.800
.550	2.587	-334.00	6.900	-334.00	6.202	3.025	.825
.567	2.483	-351.00	6.620	-351.00	6.538	1.036	.850
.583	2.535	-368.00	6.760	-368.00	6.694	-.941	.875
.600	2.685	-383.40	7.160	-383.40	6.571	-2.844	.900
.617	2.932	-395.40	7.820	-395.40	6.374	-4.530	.925
.633	3.150	-406.00	8.400	-406.00	5.835	-6.042	.950
.650	3.382	-414.00	9.020	-414.00	5.302	-7.297	.975
.667	3.578	-420.00	9.540	-420.00	4.770	-8.262	1.000
.683	3.727	-425.50	9.940	-425.50	4.122	-9.045	1.025
.700	3.780	-430.40	10.080	-430.40	3.381	-9.496	1.050
.717	3.698	-435.40	9.860	-435.40	2.485	-9.542	1.075
.733	3.630	-440.40	9.680	-440.40	1.619	-9.544	1.100
.750	3.277	-443.00	8.740	-443.00	1.065	-8.675	1.125
.767	2.985	-447.00	7.960	-447.00	.417	-7.949	1.150
.783	2.662	-451.80	7.100	-451.80	-.223	-7.096	1.175
.800	2.212	-457.60	5.900	-457.60	-.780	-5.848	1.200
.817	1.717	-466.60	4.580	-466.60	-1.308	-4.389	1.225
.833	1.140	-482.00	3.040	-482.00	-1.611	-2.578	1.250
.850	.795	-515.00	2.120	-515.00	-1.921	-.896	1.275
.867	.878	-559.00	2.340	-559.00	-2.213	.762	1.300
.883	1.282	-585.50	3.420	-585.50	-2.397	2.439	1.325
.900	1.792	-597.80	4.780	-597.80	-2.547	4.045	1.350
.917	2.347	-604.40	6.260	-604.40	-2.705	5.645	1.375
.933	2.700	-608.00	7.200	-608.00	-2.697	6.676	1.400
.950	3.037	-610.00	8.100	-610.00	-2.770	7.612	1.425
.967	3.382	-612.00	9.020	-612.00	-2.787	8.579	1.450
.983	3.600	-613.00	9.600	-613.00	-2.807	9.181	1.475
.991	3.877	-613.00	10.340	-613.00	-3.023	9.888	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .1289   BETAL/BETAO = 1.143   H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ   PE = .067   D/LAMDAO = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	9.990	150.00	6.000	20.00	5.638	2.052	.003
.025	8.691	140.50	5.340	10.50	5.251	.973	.025
.050	8.358	130.80	5.020	.80	5.020	.070	.050
.075	7.692	118.50	4.620	-11.50	4.527	-.921	.075
.100	7.159	105.30	4.300	-24.70	3.907	-1.797	.100
.125	6.693	91.10	4.020	-38.90	3.129	-2.524	.125
.150	6.560	80.00	3.940	-50.00	2.533	-3.018	.150
.175	6.693	62.10	4.020	-67.90	1.512	-3.725	.175
.200	6.893	49.30	4.140	-80.70	.669	-4.086	.200
.225	7.326	38.00	4.400	-92.00	-.154	-4.397	.225
.250	7.692	27.50	4.620	-102.50	-1.000	-4.510	.250
.275	7.992	19.30	4.800	-110.70	-1.697	-4.490	.275
.300	8.325	11.80	5.000	-118.20	-2.363	-4.407	.300
.325	8.458	4.00	5.080	-126.00	-2.986	-4.110	.325
.350	8.392	-1.50	5.040	-131.50	-3.340	-3.775	.350
.375	8.192	-7.60	4.920	-137.60	-3.633	-3.318	.375
.400	7.692	-13.50	4.620	-143.50	-3.714	-2.748	.400
.425	7.159	-20.00	4.300	-150.00	-3.724	-2.150	.425
.450	6.394	-26.60	3.840	-156.60	-3.524	-1.525	.450
.475	5.694	-34.40	3.420	-164.40	-3.294	-.920	.475
.500	4.762	-45.00	2.860	-175.00	-2.849	-.249	.500
.525	3.896	-58.50	2.340	-188.50	-2.314	.346	.525
.550	3.363	-76.80	2.020	-206.80	-1.803	.911	.550
.575	3.064	-100.00	1.840	-230.00	-1.183	1.410	.575
.600	3.263	-122.70	1.960	-252.70	-.583	1.871	.600
.625	3.763	-141.20	2.260	-271.20	.047	2.260	.625
.650	4.362	-153.30	2.620	-283.30	.603	2.550	.650
.675	5.161	-162.70	3.100	-292.70	1.196	2.860	.675
.700	5.794	-169.50	3.480	-299.50	1.714	3.029	.700
.725	6.360	-174.40	3.820	-304.40	2.158	3.152	.725
.750	6.826	-178.70	4.100	-308.70	2.563	3.200	.750
.775	6.993	-181.00	4.200	-311.00	2.755	3.170	.775
.800	6.860	-183.20	4.120	-313.20	2.820	3.003	.800
.825	6.760	-185.50	4.060	-315.50	2.896	2.846	.825
.850	6.161	-187.00	3.700	-317.00	2.706	2.523	.850
.875	5.594	-188.50	3.360	-318.50	2.516	2.226	.875
.900	4.695	-189.20	2.820	-319.20	2.135	1.843	.900
.925	3.596	-190.00	2.160	-320.00	1.655	1.388	.925
.950	2.731	-190.60	1.640	-320.60	1.267	1.041	.950
.975	1.532	-191.30	.920	-321.30	.718	.575	.975
.984	.999	-192.00	.600	-322.00	.473	.369	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	9.694	-3.40	26.200	-3.40	26.154	-1.554	.006
.025	8.140	-11.50	22.000	-11.50	21.558	-4.386	.025
.050	8.096	-20.20	21.880	-20.20	20.539	-7.555	.050
.075	8.140	-29.40	22.000	-29.40	19.167	-10.800	.075
.100	8.140	-37.00	22.000	-37.00	17.570	-13.240	.100
.125	7.940	-45.00	21.460	-45.00	15.174	-15.175	.125
.150	7.541	-50.30	20.380	-50.30	13.018	-15.680	.150
.175	7.444	-58.60	20.120	-58.60	10.483	-17.173	.175
.200	6.993	-65.80	18.900	-65.80	7.748	-17.239	.200
.225	6.394	-74.00	17.280	-74.00	4.763	-16.611	.225
.250	5.794	-83.30	15.660	-83.30	1.827	-15.553	.250
.275	5.247	-94.40	14.180	-94.40	-1.088	-14.138	.275
.300	4.647	-107.30	12.560	-107.30	-3.735	-11.992	.300
.325	4.248	-123.00	11.480	-123.00	-6.252	-9.628	.325
.350	4.100	-140.70	11.080	-140.70	-8.574	-7.018	.350
.375	4.196	-158.00	11.340	-158.00	-10.514	-4.248	.375
.400	4.396	-174.00	11.880	-174.00	-11.815	-1.242	.400
.425	4.847	-186.80	13.100	-186.80	-13.008	1.551	.425
.450	5.247	-197.00	14.180	-197.00	-13.560	4.146	.450
.475	5.594	-205.30	15.120	-205.30	-13.670	6.462	.475
.500	5.846	-212.00	15.800	-212.00	-13.399	8.373	.500
.525	5.994	-217.60	16.200	-217.60	-12.835	9.884	.525
.550	6.098	-222.60	16.480	-222.60	-12.131	11.155	.550
.575	5.942	-227.00	16.060	-227.00	-10.953	11.746	.575
.600	5.794	-231.00	15.660	-231.00	-9.855	12.170	.600
.625	5.299	-235.00	14.320	-235.00	-8.214	11.730	.625
.650	4.847	-239.40	13.100	-239.40	-6.668	11.276	.650
.675	4.299	-244.00	11.620	-244.00	-5.094	10.444	.675
.700	3.545	-250.00	9.580	-250.00	-3.277	9.002	.700
.725	2.760	-259.30	7.460	-259.30	-1.385	7.330	.725
.750	1.820	-275.60	4.920	-275.60	.480	4.897	.750
.775	1.302	-308.60	3.520	-308.60	2.196	2.751	.775
.800	1.458	-352.50	3.940	-352.50	3.906	.514	.800
.825	2.176	-378.00	5.880	-378.00	5.592	-1.817	.825
.850	2.975	-390.30	8.040	-390.30	6.942	-4.056	.850
.875	3.848	-396.50	10.400	-396.50	8.360	-6.186	.875
.900	4.344	-400.80	11.740	-400.80	8.887	-7.671	.900
.925	4.899	-403.20	13.240	-403.20	9.652	-9.063	.925
.950	5.543	-404.70	14.980	-404.70	10.448	-10.537	.950
.975	5.846	-405.80	15.800	-405.80	11.015	-11.327	.975
.987	6.297	-406.00	17.020	-406.00	11.823	-12.243	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0911 BETAL/BETAC = 1.052 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ RE = .067 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	[illegible]	140.10	4.200	25.10	3.803	1.782	.003
.017	7.025	128.40	3.860	13.40	3.755	.895	.025
.033	6.479	116.00	3.560	1.00	3.659	.062	.050
.050	6.115	102.10	3.360	-12.90	3.275	-.750	.075
.067	6.005	88.80	3.300	-26.20	2.961	-1.457	.100
.083	6.042	74.90	3.320	-40.10	2.540	-2.138	.125
.100	6.224	62.40	3.420	-52.60	2.027	-2.717	.150
.117	6.625	50.60	3.640	-64.40	1.573	-3.283	.175
.133	6.952	40.40	3.820	-74.60	1.014	-3.683	.200
.150	7.353	31.50	4.040	-83.50	.457	-4.014	.225
.167	7.607	23.90	4.180	-91.10	-.080	-4.179	.250
.183	7.862	17.10	4.320	-97.90	-.594	-4.279	.275
.200	7.972	10.70	4.380	-104.30	-1.082	-4.244	.300
.217	7.972	4.50	4.380	-110.50	-1.534	-4.103	.325
.233	7.899	-1.10	4.340	-116.10	-1.909	-3.897	.350
.250	7.607	-7.00	4.180	-122.00	-2.215	-3.545	.375
.267	7.207	-13.20	3.960	-128.20	-2.449	-3.112	.400
.283	6.807	-19.60	3.740	-134.60	-2.626	-2.663	.425
.300	6.152	-27.10	3.380	-142.10	-2.667	-2.076	.450
.317	5.533	-36.00	3.040	-151.00	-2.659	-1.474	.475
.333	5.023	-47.20	2.760	-162.20	-2.628	-.844	.500
.350	4.368	-60.00	2.400	-175.00	-2.391	-.209	.525
.367	3.968	-76.50	2.180	-191.50	-2.136	.435	.550
.383	3.822	-94.30	2.100	-209.30	-1.831	1.028	.575
.400	4.004	-113.30	2.200	-228.30	-1.464	1.643	.600
.417	4.368	-127.70	2.400	-242.70	-1.101	2.133	.625
.433	4.877	-139.00	2.680	-254.00	-.739	2.576	.650
.450	5.424	-148.50	2.960	-263.50	-.337	2.961	.675
.467	5.897	-155.30	3.240	-270.30	.017	3.240	.700
.483	6.370	-161.70	3.500	-276.70	.408	3.476	.725
.500	6.661	-167.40	3.660	-282.40	.786	3.575	.750
.517	6.880	-171.50	3.780	-286.50	1.074	3.624	.775
.533	6.916	-175.40	3.800	-290.40	1.325	3.562	.800
.550	6.807	-179.80	3.740	-294.80	1.569	3.395	.825
.567	6.552	-183.00	3.600	-298.00	1.690	3.179	.850
.583	6.115	-187.10	3.360	-302.10	1.785	2.846	.875
.600	5.496	-191.30	3.020	-306.30	1.788	2.434	.900
.617	4.768	-196.40	2.620	-311.40	1.733	1.965	.925
.633	4.004	-202.80	2.200	-317.80	1.630	1.478	.950
.650	3.203	-212.00	1.760	-327.00	1.493	.969	.975
.667	2.475	-228.00	1.360	-343.00	1.301	.398	1.000
.683	1.966	-251.80	1.080	-366.80	1.072	-.128	1.025
.700	1.929	-283.80	1.060	-398.80	.826	-.664	1.050
.717	2.402	-310.60	1.320	-425.60	.545	-1.202	1.075
.733	3.094	-326.50	1.700	-441.50	.251	-1.681	1.100
.750	3.895	-336.00	2.140	-451.00	-.037	-2.140	1.125
.767	4.550	-342.00	2.500	-457.00	-.305	-2.481	1.150
.783	5.242	-346.40	2.880	-461.40	-.569	-2.823	1.175
.800	5.824	-349.50	3.200	-464.50	-.801	-3.098	1.200
.817	6.297	-352.00	3.460	-467.00	-1.012	-3.309	1.225
.833	6.479	-353.60	3.560	-468.60	-1.135	-3.374	1.250
.850	6.625	-355.40	3.640	-470.40	-1.269	-3.412	1.275
.867	6.406	-356.30	3.520	-471.30	-1.279	-3.280	1.300
.883	6.224	-357.30	3.420	-472.30	-1.298	-3.164	1.325
.900	5.642	-358.00	3.100	-473.00	-1.211	-2.854	1.350
.917	5.169	-358.90	2.840	-473.90	-1.151	-2.596	1.375
.933	4.332	-359.10	2.380	-474.10	-.972	-2.173	1.400
.950	3.422	-359.50	1.880	-474.50	-.780	-1.711	1.425
.967	2.548	-359.90	1.400	-474.90	-.589	-1.270	1.450
.983	1.420	-359.90	.780	-474.90	-.328	-.707	1.475
.989	.946	-360.40	.520	-475.40	-.223	-.470	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	9.963	.00	24.000	.00	24.000	.000	.006
.017	7.968	-6.30	19.200	-6.30	19.084	-2.107	.025
.033	7.470	-13.00	18.000	-13.00	17.539	-4.049	.050
.050	7.321	-20.30	17.640	-20.30	16.544	-6.120	.075
.067	7.155	-26.90	17.240	-26.90	15.375	-7.800	.100
.083	6.872	-33.60	16.560	-33.60	13.793	-9.164	.125
.100	6.574	-39.50	15.840	-39.50	12.223	-10.075	.150
.117	6.225	-47.10	15.000	-47.10	10.211	-10.988	.175
.133	5.777	-55.30	13.920	-55.30	7.924	-11.444	.200
.150	5.378	-64.50	12.960	-64.50	5.579	-11.698	.225
.167	4.831	-74.80	11.640	-74.80	3.052	-11.233	.250
.183	4.382	-86.80	10.560	-86.80	.589	-10.544	.275
.200	4.084	-100.50	9.840	-100.50	-1.793	-9.675	.300
.217	3.984	-116.00	9.600	-116.00	-4.208	-8.628	.325
.233	4.133	-131.10	9.960	-131.10	-6.547	-7.505	.350
.250	4.382	-144.80	10.560	-144.80	-8.629	-6.087	.375
.267	4.681	-157.20	11.280	-157.20	-10.399	-4.371	.400
.283	4.980	-167.40	12.000	-167.40	-11.711	-2.618	.425
.300	5.329	-175.70	12.840	-175.70	-12.804	-.963	.450
.317	5.727	-183.00	13.800	-183.00	-13.781	.722	.475
.333	5.827	-189.50	14.040	-189.50	-13.847	2.317	.500
.350	6.026	-195.00	14.520	-195.00	-14.025	3.758	.525
.367	6.076	-200.40	14.640	-200.40	-13.722	5.103	.550
.383	5.976	-205.10	14.400	-205.10	-13.090	6.108	.575
.400	5.827	-210.30	14.040	-210.30	-12.122	7.084	.600
.417	5.461	-215.00	13.160	-215.00	-10.780	7.548	.625
.433	5.030	-220.40	12.120	-220.40	-9.230	7.855	.650
.450	4.532	-226.70	10.920	-226.70	-7.489	7.947	.675
.467	3.984	-234.20	9.600	-234.20	-5.616	7.786	.700
.483	3.337	-244.20	8.040	-244.20	-3.499	7.239	.725
.500	2.805	-258.00	6.760	-258.00	-1.405	6.612	.750
.517	2.440	-276.70	5.880	-276.70	.686	5.840	.775
.533	2.282	-299.50	5.500	-299.50	2.708	4.787	.800
.550	2.473	-321.80	5.960	-321.80	4.684	3.686	.825
.567	2.905	-338.80	7.000	-338.80	6.526	2.531	.850
.583	3.386	-351.00	8.160	-351.00	8.060	1.277	.875
.600	3.884	-359.80	9.360	-359.80	9.360	.033	.900
.617	4.382	-366.20	10.560	-366.20	10.498	-1.140	.925
.633	4.781	-371.00	11.520	-371.00	11.308	-2.198	.950
.650	5.080	-375.20	12.240	-375.20	11.812	-3.209	.975
.667	5.262	-378.40	12.680	-378.40	12.032	-4.002	1.000
.683	5.362	-381.10	12.920	-381.10	12.054	-4.651	1.025
.700	5.329	-384.20	12.840	-384.20	11.712	-5.263	1.050
.717	5.030	-387.30	12.120	-387.30	10.770	-5.559	1.075
.733	4.764	-389.00	11.480	-389.00	10.041	-5.566	1.100
.750	4.183	-391.40	10.080	-391.40	8.604	-5.252	1.125
.767	3.652	-394.00	8.800	-394.00	7.296	-4.921	1.150
.783	3.088	-397.30	7.440	-397.30	5.918	-4.509	1.175
.800	2.390	-402.80	5.760	-402.80	4.226	-3.914	1.200
.817	1.652	-413.00	3.980	-413.00	2.395	-3.179	1.225
.833	.921	-439.00	2.220	-439.00	.424	-2.179	1.250
.850	.813	-498.50	1.960	-498.50	-1.468	-1.299	1.275
.867	1.428	-534.00	3.440	-534.00	-3.421	-.360	1.300
.883	2.158	-547.00	5.200	-547.00	-5.161	.634	1.325
.900	2.946	-552.80	7.100	-552.80	-6.924	1.573	1.350
.917	3.735	-556.30	9.000	-556.30	-8.638	2.526	1.375
.933	4.183	-558.40	10.080	-558.40	-9.565	3.182	1.400
.950	4.681	-560.00	11.280	-560.00	-10.600	3.858	1.425
.967	5.279	-560.70	12.720	-560.70	-11.899	4.496	1.450
.983	5.677	-561.30	13.680	-561.30	-12.746	4.969	1.475
.991	6.225	-561.40	15.000	-561.40	-13.966	5.473	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0911 BETAL/BETAC = 1.052 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	7.000	150.00	3.440	35.00	2.818	1.973	.003
.025	5.561	136.50	2.880	21.50	2.680	1.056	.025
.050	5.291	119.40	2.600	4.40	2.592	.199	.050
.075	5.047	99.80	2.480	-15.20	2.393	-.650	.075
.100	5.250	82.50	2.580	-32.50	2.176	-1.386	.100
.125	4.965	96.20	2.440	-18.80	2.310	-.786	.125
.150	6.512	54.10	3.200	-60.90	1.556	-2.796	.150
.175	7.285	44.50	3.580	-70.50	1.195	-3.375	.175
.200	7.977	37.00	3.920	-78.00	.815	-3.834	.200
.225	8.588	30.80	4.220	-84.20	.426	-4.198	.225
.250	9.035	25.20	4.440	-85.80	.015	-4.440	.250
.275	9.280	21.20	4.560	-93.80	-.302	-4.550	.275
.300	9.361	17.20	4.600	-97.80	-.624	-4.557	.300
.325	9.280	12.60	4.560	-102.40	-.979	-4.454	.325
.350	8.995	9.30	4.420	-105.70	-1.196	-4.255	.350
.375	8.425	5.40	4.140	-109.60	-1.389	-3.900	.375
.400	7.570	1.40	3.720	-113.60	-1.489	-3.409	.400
.425	6.512	-2.80	3.200	-117.80	-1.492	-2.831	.425
.450	5.454	-9.50	2.680	-124.50	-1.518	-2.209	.450
.475	4.477	-18.20	2.200	-133.20	-1.506	-1.604	.475
.500	3.378	-33.20	1.660	-148.20	-1.411	-.875	.500
.525	2.605	-57.20	1.280	-172.20	-1.268	-.174	.525
.550	2.483	-90.80	1.220	-205.80	-1.098	.531	.550
.575	3.093	-119.00	1.520	-234.00	-.893	1.230	.575
.600	4.070	-135.20	2.000	-250.20	-.677	1.882	.600
.625	5.128	-144.60	2.520	-259.60	-.455	2.479	.625
.650	5.942	-150.00	2.920	-265.00	-.255	2.909	.650
.675	7.000	-154.60	3.440	-269.60	-.024	3.440	.675
.700	7.774	-157.70	3.820	-272.70	.180	3.816	.700
.725	8.221	-160.00	4.040	-275.00	.352	4.025	.725
.750	8.669	-161.50	4.260	-276.50	.482	4.233	.750
.775	8.832	-163.20	4.340	-278.20	.619	4.296	.775
.800	8.588	-164.30	4.220	-279.30	.682	4.165	.800
.825	8.262	-165.50	4.060	-280.50	.740	3.992	.825
.850	7.611	-166.30	3.740	-281.30	.733	3.667	.850
.875	6.960	-167.20	3.420	-282.20	.723	3.343	.875
.900	5.820	-167.60	2.860	-282.60	.624	2.791	.900
.925	4.518	-168.10	2.220	-283.10	.503	2.162	.925
.950	3.378	-168.50	1.660	-283.50	.388	1.614	.950
.975	1.913	-169.00	.940	-284.00	.227	.912	.975
.984	1.262	-169.40	.620	-284.40	.154	.601	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	11.296	.30	22.820	.30	22.820	.119	.006
.025	9.167	-4.00	18.520	-4.00	18.475	-1.292	.025
.050	8.752	-9.10	17.680	-9.10	17.457	-2.796	.050
.075	8.445	-14.10	17.060	-14.10	16.546	-4.156	.075
.100	8.148	-18.80	16.460	-18.80	15.582	-5.304	.100
.125	7.623	-23.50	15.400	-23.50	14.123	-6.141	.125
.150	6.999	-29.10	14.140	-29.10	12.355	-6.877	.150
.175	6.316	-35.00	12.760	-35.00	10.452	-7.319	.175
.200	5.504	-42.40	11.120	-42.40	8.212	-7.498	.200
.225	4.783	-52.00	9.660	-52.00	5.947	-7.612	.225
.250	4.000	-65.00	8.080	-65.00	3.415	-7.323	.250
.275	3.396	-83.30	6.860	-83.30	.800	-6.813	.275
.300	3.135	-106.50	6.340	-106.50	-1.801	-6.079	.300
.325	3.346	-129.40	6.760	-129.40	-4.291	-5.224	.325
.350	3.950	-147.50	7.980	-147.50	-6.730	-4.288	.350
.375	4.683	-160.00	9.460	-160.00	-8.889	-3.236	.375
.400	5.346	-169.00	10.800	-169.00	-10.602	-2.061	.400
.425	6.049	-175.40	12.220	-175.40	-12.181	-.980	.425
.450	6.603	-180.30	13.340	-180.30	-13.340	.070	.450
.475	7.098	-184.30	14.340	-184.30	-14.300	1.075	.475
.500	7.296	-187.60	14.740	-187.60	-14.611	1.949	.500
.525	7.395	-190.60	14.940	-190.60	-14.685	2.748	.525
.550	7.346	-193.00	14.840	-193.00	-14.460	3.338	.550
.575	6.950	-196.00	14.040	-196.00	-13.496	3.870	.575
.600	6.554	-198.00	13.240	-198.00	-12.592	4.091	.600
.625	5.801	-200.40	11.720	-200.40	-10.985	4.085	.625
.650	5.098	-203.20	10.300	-203.20	-9.467	4.058	.650
.675	4.297	-206.70	8.680	-206.70	-7.754	3.900	.675
.700	3.346	-212.30	6.760	-212.30	-5.714	3.612	.700
.725	2.336	-222.10	4.720	-222.10	-3.502	3.164	.725
.750	1.257	-247.70	2.540	-247.70	-.964	2.350	.750
.775	1.059	-307.20	2.140	-307.20	1.294	1.705	.775
.800	1.901	-344.00	3.840	-344.00	3.691	1.058	.800
.825	2.980	-357.20	6.020	-357.20	6.013	.294	.825
.850	4.000	-362.80	8.080	-362.80	8.070	-.395	.850
.875	5.098	-366.00	10.300	-366.00	10.249	-1.077	.875
.900	5.801	-368.50	11.720	-368.50	11.591	-1.732	.900
.925	6.504	-370.00	13.140	-370.00	12.940	-2.282	.925
.950	7.296	-370.80	14.740	-370.80	14.479	-2.762	.950
.975	7.851	-371.40	15.860	-371.40	15.547	-3.135	.975
.987	8.554	-371.60	17.280	-371.60	16.927	-3.475	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .1285 BETAL/BETAC = 1.143 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	8.996	160.00	3.820	45.00	2.701	2.701	.003
.050	7.395	152.60	3.140	37.60	2.488	1.916	.025
.100	6.123	132.90	2.600	17.90	2.474	.799	.050
.150	5.608	108.20	2.380	-6.80	2.363	-.282	.075
.200	6.029	83.60	2.560	-31.40	2.185	-1.334	.100
.250	7.253	64.00	3.080	-51.00	1.938	-2.394	.125
.300	8.337	52.50	3.540	-62.50	1.635	-3.140	.150
.350	9.797	43.40	4.160	-71.60	1.313	-3.947	.175
.400	10.974	37.10	4.660	-77.90	.977	-4.556	.200
.450	12.293	32.00	5.220	-83.00	.636	-5.181	.225
.500	13.000	28.80	5.520	-86.20	.366	-5.508	.250
.550	13.282	26.20	5.640	-88.80	.118	-5.639	.275
.600	13.094	24.20	5.560	-90.80	-.078	-5.559	.300
.650	12.764	22.40	5.420	-92.60	-.246	-5.414	.325
.700	11.681	21.00	4.960	-94.00	-.346	-4.948	.350
.750	10.786	19.20	4.580	-95.80	-.463	-4.557	.375
.800	9.043	18.60	3.840	-96.40	-.428	-3.816	.400
.850	6.971	18.00	2.960	-97.00	-.361	-2.938	.425
.900	5.229	17.30	2.220	-97.70	-.297	-2.200	.450
.950	2.967	16.00	1.260	-99.00	-.197	-1.244	.475
.968	1.978	215.00	.840	100.00	-.146	.827	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	14.288	2.80	26.460	2.80	26.428	1.293	.006
.050	12.236	-1.60	22.660	-1.60	22.651	-.633	.025
.100	11.988	-6.00	22.200	-6.00	22.078	-2.321	.050
.150	11.642	-10.00	21.560	-10.00	21.232	-3.744	.075
.200	11.189	-14.40	20.720	-14.40	20.069	-5.153	.100
.250	10.292	-17.80	19.060	-17.80	18.148	-5.827	.125
.300	9.245	-21.60	17.120	-21.60	15.918	-6.302	.150
.350	8.197	-26.40	15.180	-26.40	13.597	-6.750	.175
.400	6.696	-32.00	12.400	-32.00	10.516	-6.571	.200
.450	5.141	-40.50	9.520	-40.50	7.239	-6.183	.225
.500	3.402	-56.10	6.300	-56.10	3.514	-5.229	.250
.550	2.408	-91.00	4.460	-91.00	-.078	-4.459	.275
.600	2.765	-135.20	5.120	-135.20	-3.633	-3.608	.300
.650	4.093	-161.00	7.580	-161.00	-7.167	-2.468	.325
.700	5.746	-172.60	10.640	-172.60	-10.551	-1.370	.350
.750	7.495	-179.00	13.880	-179.00	-13.878	-.242	.375
.800	8.489	-182.60	15.720	-182.60	-15.704	.713	.400
.850	9.590	-185.00	17.760	-185.00	-17.692	1.548	.425
.900	10.735	-187.00	19.880	-187.00	-19.732	2.423	.450
.950	11.394	-188.00	21.100	-188.00	-20.895	2.937	.475
.974	12.290	-188.00	22.760	-188.00	-22.538	3.168	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0911 BETAL/BETAC = 1.052 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	3.496	169.50	2.100	44.50	1.498	1.472	.003
.050	2.744	146.50	1.560	21.50	1.451	.572	.025
.100	2.464	114.00	1.400	-11.00	1.374	-.267	.050
.150	2.992	83.60	1.700	-41.40	1.275	-1.124	.075
.200	3.907	63.90	2.220	-61.10	1.073	-1.944	.100
.250	4.963	53.50	2.820	-71.50	.895	-2.674	.125
.300	5.722	48.00	3.240	-77.00	.729	-3.157	.150
.350	6.721	43.00	3.820	-82.00	.532	-3.783	.175
.400	7.568	39.80	4.300	-85.80	.337	-4.287	.200
.450	8.165	36.80	4.640	-88.20	.146	-4.638	.225
.500	8.413	34.60	4.780	-90.40	-.033	-4.780	.250
.550	8.589	33.60	4.880	-91.40	-.119	-4.879	.275
.600	8.342	32.00	4.740	-92.40	-.198	-4.736	.300
.650	8.096	31.50	4.600	-93.50	-.281	-4.591	.325
.700	7.462	30.50	4.240	-94.50	-.333	-4.227	.350
.750	6.829	29.50	3.880	-95.80	-.372	-3.862	.375
.800	5.878	29.30	3.340	-95.70	-.332	-3.323	.400
.850	4.506	28.90	2.560	-96.10	-.272	-2.546	.425
.900	3.309	28.60	1.880	-96.40	-.210	-1.868	.450
.950	1.901	28.40	1.080	-96.60	-.124	-1.073	.475
.968	1.267	28.40	.720	-96.60	-.083	-.715	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	10.305	.00	23.000	.00	23.000	.000	.006
.050	8.004	-2.00	18.400	-2.00	18.389	-.642	.025
.100	7.351	-4.40	16.900	-4.40	16.850	-1.297	.050
.150	6.908	-7.80	15.880	-7.80	15.733	-2.155	.075
.200	6.508	-9.40	14.960	-9.40	14.759	-2.443	.100
.250	5.681	-12.00	13.060	-12.00	12.775	-2.715	.125
.300	5.002	-14.60	11.500	-14.60	11.129	-2.899	.150
.350	4.306	-18.50	9.900	-18.50	9.388	-3.141	.175
.400	3.306	-23.30	7.600	-23.30	6.980	-3.006	.200
.450	2.305	-34.00	5.300	-34.00	4.394	-2.964	.225
.500	1.305	-56.00	3.000	-56.00	1.678	-2.487	.250
.550	1.044	-113.10	2.400	-113.10	-.942	-2.208	.275
.600	1.818	-153.00	4.180	-153.00	-3.724	-1.898	.300
.650	2.819	-167.30	6.480	-167.30	-6.321	-1.425	.325
.700	3.854	-173.00	8.860	-173.00	-8.794	-1.080	.350
.750	4.950	-177.20	11.380	-177.20	-11.366	-.556	.375
.800	5.603	-179.20	12.880	-179.20	-12.879	-.180	.400
.850	6.255	-180.80	14.380	-180.80	-14.379	.201	.425
.900	7.108	-181.80	16.340	-181.80	-16.332	.513	.450
.950	7.656	-182.40	17.600	-182.40	-17.585	.737	.475
.974	8.352	-182.60	19.200	-182.60	-19.180	.871	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0960 BETAL/BETAC = 1.018 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	4.082	155.20	2.160	40.20	1.650	1.394	.003
.017	3.651	134.70	1.720	19.70	1.619	.580	.025
.033	2.948	108.70	1.560	-6.30	1.551	-.171	.050
.050	3.175	85.80	1.680	-29.20	1.467	-.820	.075
.067	3.704	57.20	1.960	-57.80	1.044	-1.659	.100
.083	4.427	54.50	2.340	-60.50	1.152	-2.037	.125
.100	5.141	45.50	2.720	-69.50	.953	-2.548	.150
.117	5.897	39.10	3.120	-75.90	.760	-3.026	.175
.133	6.464	34.10	3.420	-80.90	.541	-3.377	.200
.150	7.031	29.70	3.720	-85.30	.305	-3.707	.225
.167	7.182	26.60	3.800	-88.40	.106	-3.799	.250
.183	7.409	22.10	3.920	-92.90	-.198	-3.915	.275
.200	7.295	20.10	3.860	-94.90	-.330	-3.846	.300
.217	7.106	17.20	3.760	-97.80	-.510	-3.725	.325
.233	6.804	14.20	3.600	-100.80	-.675	-3.536	.350
.250	6.275	10.80	3.320	-104.20	-.814	-3.219	.375
.267	5.708	6.80	3.020	-108.20	-.943	-2.869	.400
.283	4.952	1.90	2.620	-113.10	-1.028	-2.410	.425
.300	4.120	-4.50	2.180	-119.50	-1.073	-1.897	.450
.317	3.213	-14.60	1.700	-129.60	-1.084	-1.310	.475
.333	2.495	-32.10	1.320	-147.10	-1.108	-.717	.500
.350	1.928	-59.60	1.020	-174.60	-1.015	-.096	.525
.367	2.079	-93.10	1.100	-208.10	-.970	.518	.550
.383	2.608	-116.40	1.380	-231.40	-.861	1.078	.575
.400	3.440	-130.70	1.820	-245.70	-.799	1.659	.600
.417	4.271	-139.00	2.260	-254.00	-.623	2.172	.625
.433	5.027	-144.20	2.660	-259.20	-.498	2.613	.650
.450	5.708	-148.30	3.020	-263.30	-.352	2.999	.675
.467	6.350	-150.90	3.360	-265.90	-.240	3.351	.700
.483	6.691	-153.90	3.540	-268.90	-.068	3.539	.725
.500	6.880	-156.00	3.640	-271.00	.064	3.639	.750
.517	7.031	-158.00	3.720	-273.00	.195	3.715	.775
.533	6.917	-160.00	3.660	-275.00	.319	3.646	.800
.550	6.653	-161.70	3.520	-276.70	.411	3.496	.825
.567	6.313	-163.50	3.340	-278.50	.494	3.303	.850
.583	5.746	-165.50	3.040	-280.50	.554	2.989	.875
.600	5.027	-168.00	2.660	-283.00	.598	2.592	.900
.617	4.196	-171.00	2.220	-286.00	.612	2.134	.925
.633	3.213	-176.30	1.700	-291.30	.618	1.584	.950
.650	2.381	-183.30	1.260	-298.30	.597	1.109	.975
.667	1.399	-203.50	.740	-318.50	.554	.490	1.000
.683	.983	-251.50	.520	-366.50	.517	-.059	1.025
.700	1.474	-299.50	.780	-414.50	.453	-.635	1.050
.717	2.419	-317.20	1.280	-432.20	.391	-1.219	1.075
.733	3.440	-325.30	1.820	-440.30	.307	-1.794	1.100
.750	4.309	-329.30	2.280	-444.30	.226	-2.269	1.125
.783	5.746	-334.00	3.040	-445.00	.053	-3.040	1.175
.800	6.313	-335.40	3.340	-450.40	-.023	-3.340	1.200
.817	6.842	-336.70	3.620	-451.70	-.107	-3.618	1.225
.833	7.069	-337.20	3.740	-452.20	-.144	-3.737	1.250
.850	7.069	-338.00	3.740	-453.00	-.196	-3.735	1.275
.867	6.917	-338.50	3.660	-453.50	-.223	-3.653	1.300
.883	6.653	-339.20	3.520	-454.20	-.258	-3.511	1.325
.900	6.124	-339.50	3.240	-454.50	-.254	-3.230	1.350
.917	5.594	-340.00	2.960	-455.00	-.258	-2.949	1.375
.933	4.725	-340.00	2.500	-455.00	-.218	-2.490	1.400
.950	3.704	-340.20	1.960	-455.20	-.178	-1.952	1.425
.967	2.797	-340.40	1.480	-455.40	-.139	-1.473	1.450
.983	1.625	-340.30	.860	-455.30	-.079	-.856	1.475
.989	1.096	-340.40	.580	-455.40	-.055	-.577	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	10.017	.00	22.260	.00	22.260	.000	.006
.017	7.506	-2.50	16.680	-2.50	16.664	-.728	.025
.033	6.606	-6.00	14.680	-6.00	14.600	-1.534	.050
.050	6.210	-9.20	13.800	-9.20	13.622	-2.206	.075
.067	5.760	-12.70	12.800	-12.70	12.487	-2.814	.100
.083	5.211	-17.10	11.580	-17.10	11.068	-3.405	.125
.100	4.626	-21.70	10.280	-21.70	9.551	-3.801	.150
.117	4.059	-27.90	9.020	-27.90	7.972	-4.221	.175
.133	3.384	-35.40	7.520	-35.40	6.130	-4.356	.200
.150	2.772	-47.70	6.160	-47.70	4.146	-4.556	.225
.167	2.223	-64.10	4.940	-64.10	2.158	-4.444	.250
.183	1.935	-89.40	4.300	-89.40	.045	-4.300	.275
.200	2.052	-116.50	4.560	-116.50	-2.035	-4.081	.300
.217	2.502	-137.60	5.560	-137.60	-4.106	-3.749	.325
.233	3.105	-150.30	6.900	-150.30	-5.994	-3.419	.350
.250	3.789	-159.60	8.420	-159.60	-7.892	-2.935	.375
.267	4.410	-165.70	9.800	-165.70	-9.496	-2.421	.400
.283	4.887	-170.60	10.860	-170.60	-10.714	-1.774	.425
.300	5.310	-174.40	11.800	-174.40	-11.744	-1.151	.450
.317	5.607	-177.60	12.460	-177.60	-12.449	-.522	.475
.333	5.661	-180.20	12.580	-180.20	-12.580	.044	.500
.350	5.751	-182.80	12.780	-182.80	-12.765	.624	.525
.367	5.688	-185.80	12.640	-185.80	-12.575	1.277	.550
.383	5.490	-187.70	12.200	-187.70	-12.090	1.635	.575
.400	5.130	-190.20	11.400	-190.20	-11.220	2.019	.600
.417	4.608	-193.00	10.240	-193.00	-9.978	2.303	.625
.433	4.014	-196.60	8.920	-196.60	-8.548	2.548	.650
.450	3.384	-201.00	7.520	-201.00	-7.021	2.695	.675
.467	2.682	-207.70	5.960	-207.70	-5.277	2.770	.700
.483	1.908	-219.50	4.240	-219.50	-3.272	2.697	.725
.500	1.323	-242.70	2.940	-242.70	-1.348	2.613	.750
.517	1.152	-286.40	2.560	-286.40	.723	2.456	.775
.533	1.539	-319.90	3.420	-319.90	2.616	2.203	.800
.550	2.214	-336.70	4.920	-336.70	4.519	1.946	.825
.567	2.952	-345.60	6.560	-345.60	6.354	1.631	.850
.583	3.609	-350.80	8.020	-350.80	7.917	1.282	.875
.600	4.158	-354.50	9.240	-354.50	9.197	.886	.900
.617	4.689	-357.10	10.420	-357.10	10.407	.527	.925
.633	5.058	-359.20	11.240	-359.20	11.239	.157	.950
.650	5.355	-360.70	11.900	-360.70	11.899	-.145	.975
.667	5.454	-362.10	12.120	-362.10	12.112	-.444	1.000
.683	5.589	-363.50	12.420	-363.50	12.397	-.758	1.025
.700	5.454	-365.00	12.120	-365.00	12.074	-1.056	1.050
.717	5.157	-366.30	11.460	-366.30	11.391	-1.258	1.075
.733	4.806	-367.20	10.680	-367.20	10.596	-1.339	1.100
.750	4.158	-368.60	9.240	-368.60	9.136	-1.382	1.125
.767	3.609	-369.80	8.020	-369.80	7.903	-1.365	1.150
.783	3.024	-372.00	6.720	-372.00	6.573	-1.397	1.175
.800	2.223	-375.50	4.940	-375.50	4.760	-1.320	1.200
.817	1.404	-382.30	3.120	-382.30	2.887	-1.184	1.225
.833	.558	-409.60	1.240	-409.60	.809	-.944	1.250
.850	.630	-506.00	1.400	-506.00	-1.161	-.783	1.275
.867	1.485	-529.50	3.300	-529.50	-3.245	-.601	1.300
.883	2.349	-536.00	5.220	-536.00	-5.207	-.364	1.325
.900	3.186	-538.80	7.080	-538.80	-7.078	-.148	1.350
.917	4.005	-540.50	8.900	-540.50	-8.900	.078	1.375
.933	4.554	-541.60	10.120	-541.60	-10.116	.283	1.400
.950	5.157	-542.50	11.460	-542.50	-11.449	.500	1.425
.967	5.859	-543.00	13.020	-543.00	-13.002	.681	1.450
.983	6.408	-543.50	14.240	-543.50	-14.213	.869	1.475
.991	7.155	-543.70	15.900	-543.70	-15.867	1.026	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0960 BETAL/BETAC = 1.018 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ FE = .067 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	3.400	163.10	1.700	48.10	1.135	1.265	.003
.025	2.360	139.00	1.180	24.00	1.078	.480	.025
.050	2.160	101.10	1.080	-13.90	1.048	-.259	.050
.075	2.640	72.20	1.320	-42.80	.969	-.897	.075
.100	3.440	54.70	1.720	-60.30	.852	-1.494	.100
.125	4.400	45.00	2.200	-70.00	.752	-2.067	.125
.150	5.240	39.00	2.620	-76.00	.634	-2.542	.150
.175	6.080	34.40	3.040	-80.60	.497	-2.999	.175
.200	6.720	31.00	3.360	-84.00	.351	-3.342	.200
.225	7.200	28.50	3.600	-86.50	.220	-3.593	.225
.250	7.520	26.30	3.760	-88.70	.085	-3.759	.250
.275	7.640	24.10	3.820	-90.90	-.060	-3.820	.275
.300	7.600	22.20	3.800	-92.80	-.184	-3.795	.300
.325	7.320	20.40	3.660	-94.60	-.294	-3.648	.325
.350	6.920	18.80	3.460	-96.20	-.374	-3.440	.350
.375	6.320	16.90	3.160	-98.10	-.445	-3.128	.375
.400	5.520	14.30	2.760	-100.70	-.512	-2.712	.400
.425	4.640	11.40	2.320	-103.60	-.546	-2.[illegible]55	.425
.450	3.640	7.10	1.820	-107.90	-.559	-1.[illegible]32	.450
.475	2.640	-.80	1.320	-115.80	-.575	-1.188	.475
.500	1.600	-19.40	.800	-134.40	-.560	-.572	.500
.525	1.040	-68.20	.520	-183.20	-.519	.029	.525
.550	1.560	-116.50	.780	-231.50	-.486	.610	.550
.575	2.600	-135.90	1.300	-250.90	-.425	1.228	.575
.600	3.640	-144.00	1.820	-259.00	-.347	1.787	.600
.625	4.520	-147.70	2.260	-262.70	-.287	2.242	.625
.650	5.360	-150.30	2.680	-265.30	-.220	2.671	.650
.675	6.200	-152.30	3.100	-267.30	-.146	3.097	.675
.700	6.840	-153.70	3.420	-268.70	-.078	3.419	.700
.725	7.240	-154.80	3.620	-269.80	-.013	3.620	.725
.750	7.600	-155.50	3.800	-270.50	.033	3.800	.750
.775	7.640	-156.40	3.820	-271.40	.093	3.819	.775
.800	7.400	-156.70	3.700	-271.70	.110	3.698	.800
.825	7.120	-157.40	3.560	-272.40	.149	3.557	.825
.850	6.600	-157.80	3.300	-272.80	.161	3.296	.850
.875	6.000	-158.30	3.000	-273.30	.173	2.995	.875
.900	5.000	-158.40	2.500	-273.40	.148	2.496	.900
.925	4.000	-158.50	2.000	-273.50	.122	1.996	.925
.950	3.040	-158.80	1.520	-273.80	.101	1.517	.950
.975	1.760	-158.80	.880	-273.80	.058	.878	.975
.984	1.160	-158.80	.580	-273.80	.038	.579	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.006	9.997	.00	21.500	.00	21.500	.000	.006
.025	7.496	-1.60	16.120	-1.60	16.114	-.450	.025
.050	6.649	-3.90	14.300	-3.90	14.267	-.973	.050
.075	6.147	-6.30	13.220	-6.30	13.140	-1.451	.075
.100	5.645	-8.80	12.140	-8.80	11.997	-1.857	.100
.125	5.078	-11.50	10.920	-11.50	10.701	-2.177	.125
.150	4.417	-15.00	9.500	-15.00	9.176	-2.459	.150
.175	3.748	-19.20	8.060	-19.20	7.612	-2.651	.175
.200	3.022	-25.90	6.500	-25.90	5.847	-2.839	.200
.225	2.213	-36.20	4.760	-36.20	3.841	-2.811	.225
.250	1.525	-57.30	3.280	-57.30	1.772	-2.760	.250
.275	1.274	-97.00	2.740	-97.00	-.334	-2.720	.275
.300	1.646	-133.90	3.540	-133.90	-2.455	-2.551	.300
.325	2.353	-152.50	5.060	-152.50	-4.488	-2.336	.325
.350	3.143	-162.00	6.760	-162.00	-6.429	-2.089	.350
.375	3.897	-168.00	8.380	-168.00	-8.197	-1.742	.375
.400	4.501	-171.80	9.680	-171.80	-9.581	-1.381	.400
.425	5.096	-174.50	10.960	-174.50	-10.910	-1.050	.425
.450	5.496	-176.70	11.820	-176.70	-11.800	-.680	.450
.475	5.850	-178.50	12.580	-178.50	-12.576	-.329	.475
.500	5.980	-179.80	12.860	-179.80	-12.860	-.045	.500
.525	6.101	-181.30	13.120	-181.30	-13.117	.298	.525
.550	5.952	-182.50	12.800	-182.50	-12.788	.558	.550
.575	5.496	-184.30	11.820	-184.30	-11.787	.886	.575
.600	5.227	-184.80	11.240	-184.80	-11.201	.941	.600
.625	4.501	-186.50	9.680	-186.50	-9.618	1.096	.625
.650	3.952	-188.00	8.500	-188.00	-8.417	1.183	.650
.675	3.246	-190.00	6.980	-190.00	-6.874	1.212	.675
.700	2.418	-193.10	5.200	-193.10	-5.065	1.179	.700
.725	1.525	-200.20	3.280	-200.20	-3.078	1.133	.725
.750	.614	-228.50	1.320	-228.50	-.875	.989	.750
.775	.679	-323.20	1.460	-323.20	1.169	.875	.775
.800	1.562	-347.20	3.360	-347.20	3.277	.744	.800
.825	2.502	-354.00	5.380	-354.00	5.351	.562	.825
.850	3.376	-357.00	7.260	-357.00	7.250	.380	.850
.875	4.297	-358.80	9.240	-358.80	9.238	.194	.875
.900	4.845	-359.80	10.420	-359.80	10.420	.036	.900
.925	5.496	-360.60	11.820	-360.60	11.819	-.124	.925
.950	6.296	-361.30	13.540	-361.30	13.537	-.307	.950
.975	6.901	-361.70	14.840	-361.70	14.833	-.440	.975
.987	7.645	-361.90	16.440	-361.90	16.431	-.546	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0280   BETAL/BETAC = 1.016   H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ   PE = .067   D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	3.551	172.60	1.780	57.40	.959	1.503	.003
.017	2.394	152.80	1.200	37.20	.956	.725	.025
.033	1.795	118.30	.900	3.30	.899	.052	.050
.050	2.035	80.50	1.020	-34.50	.841	-.578	.075
.067	2.793	58.60	1.400	-56.40	.775	-1.166	.100
.083	3.591	47.10	1.800	-67.90	.677	-1.668	.125
.100	4.429	40.00	2.220	-75.00	.575	-2.144	.150
.117	5.187	35.20	2.600	-79.80	.460	-2.559	.175
.133	5.746	32.20	2.880	-82.80	.361	-2.857	.200
.150	6.304	29.50	3.160	-85.60	.241	-3.150	.225
.167	6.544	27.50	3.280	-87.50	.143	-3.277	.250
.183	6.703	25.50	3.360	-89.50	.029	-3.360	.275
.200	6.623	23.50	3.320	-91.50	-.087	-3.319	.300
.217	6.504	21.80	3.260	-93.20	-.182	-3.255	.325
.233	6.224	20.00	3.120	-95.00	-.272	-3.108	.350
.250	5.746	18.10	2.880	-97.30	-.366	-2.857	.375
.267	5.187	15.60	2.600	-98.40	-.385	-2.568	.400
.283	4.429	12.60	2.220	-102.40	-.477	-2.168	.425
.300	3.511	8.90	1.760	-106.10	-.488	-1.691	.450
.317	2.633	1.90	1.320	-113.10	-.518	-1.214	.475
.333	1.756	-12.30	.880	-127.30	-.533	-.700	.500
.350	1.077	-47.30	.540	-162.30	-.514	-.164	.525
.367	1.197	-101.70	.600	-216.70	-.481	.359	.550
.383	1.955	-128.20	.980	-243.20	-.442	.875	.575
.400	2.833	-138.80	1.420	-253.80	-.396	1.364	.600
.417	3.671	-144.40	1.840	-259.40	-.338	1.809	.625
.433	4.509	-148.00	2.260	-263.00	-.275	2.243	.650
.450	5.187	-150.50	2.600	-265.50	-.204	2.592	.675
.467	5.746	-152.30	2.880	-267.30	-.136	2.877	.700
.483	6.164	-153.80	3.100	-268.80	-.065	3.099	.725
.500	6.424	-155.20	3.220	-270.20	.011	3.220	.750
.517	6.583	-156.50	3.300	-271.50	.086	3.299	.775
.533	6.504	-157.50	3.260	-272.50	.142	3.257	.800
.550	6.304	-158.80	3.160	-273.80	.209	3.153	.825
.567	5.945	-160.00	2.980	-275.00	.260	2.969	.850
.583	5.466	-161.20	2.740	-276.20	.296	2.724	.875
.600	4.628	-163.00	2.320	-278.00	.323	2.297	.900
.617	4.030	-165.00	2.020	-280.00	.351	1.989	.925
.633	3.072	-168.20	1.540	-283.20	.352	1.499	.950
.650	2.274	-173.70	1.140	-288.70	.365	1.080	.975
.667	1.277	-188.50	.640	-303.50	.353	.534	1.000
.683	.678	-234.00	.340	-349.00	.334	.065	1.025
.700	1.077	-299.00	.540	-414.00	.317	-.437	1.050
.717	1.995	-318.00	1.000	-433.00	.292	-.956	1.075
.733	3.032	-325.20	1.520	-440.20	.259	-1.498	1.100
.750	3.870	-328.30	1.940	-443.30	.226	-1.927	1.125
.767	4.509	-330.50	2.260	-445.50	.177	-2.253	1.150
.783	5.267	-332.00	2.640	-447.00	.138	-2.636	1.175
.800	5.825	-333.00	2.920	-448.00	.102	-2.918	1.200
.817	6.304	-333.70	3.160	-448.70	.072	-3.159	1.225
.833	6.623	-334.50	3.320	-449.50	.029	-3.320	1.250
.850	6.663	-335.10	3.340	-450.10	-.006	-3.340	1.275
.867	6.504	-335.50	3.260	-450.50	-.028	-3.260	1.300
.883	6.304	-335.60	3.160	-450.60	-.033	-3.160	1.325
.900	5.865	-336.50	2.940	-451.50	-.077	-2.939	1.350
.917	5.387	-336.60	2.700	-451.60	-.075	-2.699	1.375
.933	4.509	-336.80	2.260	-451.80	-.071	-2.259	1.400
.950	3.631	-336.70	1.820	-451.70	-.054	-1.819	1.425
.967	2.793	-336.70	1.400	-451.70	-.042	-1.399	1.450
.983	1.636	-337.00	.820	-452.00	-.029	-.820	1.475
.989	1.117	-337.00	.560	-452.00	-.020	-.560	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	9.997	-3.00	21.500	-3.00	21.471	-1.125	.006
.017	7.375	-4.40	15.860	-4.40	15.813	-1.217	.025
.033	6.398	-6.10	13.760	-6.10	13.682	-1.462	.050
.050	5.850	-8.20	12.580	-8.20	12.451	-1.794	.075
.067	5.320	-10.10	11.440	-10.10	11.263	-2.006	.100
.083	4.715	-12.40	10.140	-12.40	9.896	-2.212	.125
.100	4.148	-15.40	8.920	-15.40	8.600	-2.369	.150
.117	3.497	-19.70	7.520	-19.70	7.080	-2.535	.175
.133	2.829	-25.10	6.080	-25.10	5.470	-2.562	.200
.150	2.120	-34.90	4.560	-34.90	3.740	-2.609	.225
.167	1.451	-51.60	3.120	-51.60	1.938	-2.445	.250
.183	1.088	-87.80	2.340	-87.80	.090	-2.338	.275
.200	1.302	-128.50	2.800	-128.50	-1.743	-2.191	.300
.217	1.888	-151.20	4.060	-151.20	-3.558	-1.956	.325
.233	2.585	-161.90	5.560	-161.90	-5.285	-1.727	.350
.250	3.301	-168.00	7.100	-168.00	-6.945	-1.476	.375
.267	3.897	-172.20	8.380	-172.20	-8.302	-1.137	.400
.283	4.399	-175.30	9.460	-175.30	-9.428	-.775	.425
.300	4.799	-177.60	10.320	-177.60	-10.311	-.432	.450
.317	5.152	-179.60	11.080	-179.60	-11.080	-.077	.475
.333	5.199	-181.20	11.180	-181.20	-11.178	.234	.500
.350	5.301	-182.80	11.400	-182.80	-11.386	.557	.525
.367	5.217	-184.10	11.220	-184.10	-11.191	.802	.550
.383	5.050	-185.50	10.860	-185.50	-10.810	1.041	.575
.400	4.752	-187.00	10.220	-187.00	-10.144	1.245	.600
.417	4.278	-189.00	9.200	-189.00	-9.087	1.439	.625
.433	3.748	-191.00	8.060	-191.00	-7.912	1.538	.650
.450	3.153	-193.80	6.780	-193.80	-6.584	1.617	.675
.467	2.446	-197.70	5.260	-197.70	-5.011	1.599	.700
.483	1.683	-205.90	3.620	-205.90	-3.256	1.581	.725
.500	.986	-224.60	2.120	-224.60	-1.509	1.489	.750
.517	.660	-281.60	1.420	-281.60	.286	1.391	.775
.533	1.097	-328.00	2.360	-328.00	2.001	1.251	.800
.550	1.804	-344.00	3.880	-344.00	3.730	1.069	.825
.567	2.548	-350.80	5.480	-350.80	5.410	.876	.850
.583	3.199	-354.60	6.880	-354.60	6.849	.647	.875
.600	3.748	-357.20	8.060	-357.20	8.050	.394	.900
.617	4.204	-359.00	9.040	-359.00	9.039	.158	.925
.633	4.603	-360.40	9.900	-360.40	9.900	-.069	.950
.650	4.901	-361.50	10.540	-361.50	10.536	-.276	.975
.667	5.050	-362.50	10.860	-362.50	10.850	-.474	1.000
.683	5.096	-363.20	10.960	-363.20	10.943	-.612	1.025
.700	5.050	-364.00	10.860	-364.00	10.834	-.758	1.050
.717	4.780	-364.80	10.280	-364.80	10.244	-.860	1.075
.733	4.445	-365.50	9.560	-365.50	9.516	-.916	1.100
.750	3.952	-366.60	8.500	-366.60	8.444	-.977	1.125
.767	3.348	-368.00	7.200	-368.00	7.130	-1.002	1.150
.783	2.855	-369.50	6.140	-369.50	6.066	-1.013	1.175
.800	2.167	-371.50	4.660	-371.50	4.566	-.929	1.200
.817	1.404	-376.40	3.020	-376.40	2.897	-.853	1.225
.833	.539	-392.50	1.160	-392.50	.978	-.623	1.250
.850	.446	-507.00	.960	-507.00	-.805	-.523	1.275
.867	1.228	-531.60	2.640	-531.60	-2.612	-.386	1.300
.883	2.046	-537.40	4.400	-537.40	-4.395	-.200	1.325
.900	2.874	-540.00	6.180	-540.00	-6.180	.000	1.350
.917	3.701	-541.50	7.960	-541.50	-7.957	.208	1.375
.933	4.204	-542.50	9.040	-542.50	-9.031	.394	1.400
.950	4.845	-543.20	10.420	-543.20	-10.404	.582	1.425
.967	5.599	-543.80	12.040	-543.80	-12.014	.798	1.450
.983	6.250	-544.40	13.440	-544.40	-13.400	1.031	1.475
.991	7.049	-544.60	15.160	-544.60	-15.111	1.216	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0280 BETAL/BETAC = 1.016 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	3.280	177.00	1.620	62.00	.761	1.430	.003
.025	1.944	155.80	.960	40.80	.727	.627	.025
.050	1.377	111.10	.680	-3.90	.678	-.046	.050
.075	1.944	68.60	.960	-46.40	.662	-.695	.075
.100	2.754	49.70	1.360	-65.30	.568	-1.236	.100
.125	3.807	40.50	1.880	-74.50	.502	-1.812	.125
.150	4.495	36.30	2.220	-78.70	.435	-2.177	.150
.175	5.265	32.90	2.600	-82.10	.357	-2.575	.175
.200	5.832	30.50	2.880	-84.50	.276	-2.867	.200
.225	6.399	28.70	3.160	-86.30	.204	-3.153	.225
.250	6.642	27.20	3.280	-87.80	.126	-3.278	.250
.275	6.764	25.80	3.340	-89.20	.047	-3.340	.275
.300	6.764	24.40	3.340	-90.60	-.035	-3.340	.300
.325	6.520	23.20	3.220	-91.80	-.101	-3.218	.325
.350	6.196	22.10	3.060	-92.90	-.155	-3.056	.350
.375	5.589	20.80	2.760	-94.20	-.202	-2.753	.375
.400	4.901	19.40	2.420	-95.60	-.236	-2.408	.400
.425	4.091	17.50	2.020	-97.50	-.264	-2.003	.425
.450	3.280	14.60	1.620	-100.40	-.292	-1.593	.450
.475	2.308	9.50	1.140	-105.60	-.305	-1.099	.475
.500	1.296	-3.30	.640	-118.30	-.303	-.564	.500
.525	.607	-51.50	.300	-166.50	-.292	-.070	.525
.550	1.093	-123.30	.540	-238.30	-.284	.459	.550
.575	2.025	-139.00	1.000	-254.00	-.276	.961	.575
.600	2.997	-146.20	1.480	-261.20	-.226	1.463	.600
.625	3.888	-149.00	1.920	-264.00	-.201	1.909	.625
.650	4.576	-150.80	2.260	-265.80	-.166	2.254	.650
.675	5.306	-152.00	2.620	-267.00	-.137	2.616	.675
.700	5.913	-153.00	2.920	-268.00	-.102	2.918	.700
.725	6.358	-153.70	3.140	-268.70	-.071	3.139	.725
.750	6.764	-154.00	3.340	-269.00	-.058	3.339	.750
.775	6.764	-154.80	3.340	-269.80	-.012	3.340	.775
.800	6.561	-155.00	3.240	-270.00	.000	3.240	.800
.825	6.358	-155.60	3.140	-270.60	.033	3.140	.825
.850	5.954	-155.90	2.940	-270.90	.046	2.940	.850
.875	5.386	-156.50	2.660	-271.50	.070	2.659	.875
.900	4.536	-156.50	2.240	-271.50	.059	2.239	.900
.925	3.604	-156.50	1.780	-271.50	.047	1.779	.925
.950	2.754	-156.50	1.360	-271.50	.036	1.360	.950
.975	1.620	-156.50	.800	-271.50	.021	.800	.975
.984	1.093	-156.50	.540	-271.50	.014	.540	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.006	9.997	-3.00	21.500	-3.00	21.471	-1.125	.006
.025	7.300	-4.00	15.700	-4.00	15.662	-1.095	.025
.050	6.398	-5.00	13.760	-5.00	13.708	-1.199	.050
.075	5.803	-6.30	12.480	-6.30	12.405	-1.369	.075
.100	5.245	-7.90	11.280	-7.90	11.173	-1.550	.100
.125	4.650	-9.70	10.000	-9.70	9.857	-1.685	.125
.150	4.045	-11.60	8.700	-11.60	8.522	-1.749	.150
.175	3.348	-14.50	7.200	-14.50	6.971	-1.803	.175
.200	2.632	-19.00	5.660	-19.00	5.352	-1.843	.200
.225	1.776	-27.90	3.820	-27.90	3.376	-1.787	.225
.250	1.097	-45.00	2.360	-45.00	1.669	-1.669	.250
.275	.753	-97.00	1.620	-97.00	-.197	-1.608	.275
.300	1.162	-144.00	2.500	-144.00	-2.023	-1.469	.300
.325	1.897	-161.50	4.080	-161.50	-3.869	-1.295	.325
.350	2.651	-168.70	5.700	-168.70	-5.590	-1.117	.350
.375	3.348	-173.00	7.200	-173.00	-7.146	-.877	.375
.400	3.897	-175.50	8.380	-175.50	-8.354	-.657	.400
.425	4.399	-177.50	9.460	-177.50	-9.451	-.413	.425
.450	4.799	-179.00	10.320	-179.00	-10.318	-.180	.450
.475	5.096	-180.40	10.960	-180.40	-10.960	.077	.475
.500	5.245	-181.20	11.280	-181.20	-11.278	.236	.500
.525	5.310	-182.00	11.420	-182.00	-11.413	.399	.525
.550	5.301	-183.00	11.400	-183.00	-11.384	.597	.550
.575	4.949	-184.00	10.640	-184.00	-10.614	.742	.575
.600	4.650	-184.30	10.000	-184.30	-9.972	.750	.600
.625	4.101	-185.20	8.820	-185.20	-8.784	.799	.625
.650	3.553	-186.10	7.640	-186.10	-7.597	.812	.650
.675	3.004	-187.60	6.460	-187.60	-6.403	.854	.675
.700	2.269	-190.00	4.880	-190.00	-4.806	.847	.700
.725	1.460	-194.30	3.140	-194.30	-3.043	.776	.725
.750	.604	-210.80	1.300	-210.80	-1.117	.666	.750
.775	.409	-321.00	.880	-321.00	.686	.554	.775
.800	1.200	-350.00	2.580	-350.00	2.541	.448	.800
.825	2.046	-356.00	4.400	-356.00	4.389	.307	.825
.850	2.855	-358.80	6.140	-358.80	6.139	.129	.850
.875	3.646	-360.40	7.840	-360.40	7.840	-.055	.875
.900	4.204	-361.20	9.040	-361.20	9.038	-.189	.900
.925	4.901	-362.00	10.540	-362.00	10.534	-.368	.925
.950	5.645	-362.70	12.140	-362.70	12.127	-.572	.950
.975	6.352	-363.20	13.660	-363.20	13.639	-.763	.975
.987	7.096	-363.40	15.260	-363.40	15.233	-.905	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0460 BETAL/BETAC = 1.018 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	RAW DATA IRMAG	IRFAZ	NORMALIZED DATA INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	2.400	171.30	1.200	66.30	.666	.998	.003
.050	1.320	133.50	.660	18.50	.626	.209	.025
.100	1.520	76.90	.760	-38.10	.598	-.469	.050
.150	2.440	51.40	1.220	-63.60	.542	-1.093	.075
.200	3.560	41.00	1.780	-74.00	.491	-1.711	.100
.250	4.640	35.40	2.320	-75.60	.419	-2.282	.125
.300	5.320	32.60	2.660	-82.40	.352	-2.637	.150
.350	6.160	30.20	3.080	-84.80	.279	-3.067	.175
.400	6.840	28.80	3.420	-86.20	.227	-3.412	.200
.450	7.320	27.30	3.660	-87.70	.147	-3.657	.225
.500	7.600	26.80	3.800	-88.20	.119	-3.798	.250
.550	7.640	25.80	3.820	-85.20	.053	-3.820	.275
.600	7.400	25.10	3.700	-89.90	.006	-3.700	.300
.650	7.120	24.40	3.560	-90.60	-.037	-3.560	.325
.700	6.560	23.90	3.280	-91.10	-.063	-3.279	.350
.750	6.000	23.40	3.000	-91.60	-.084	-2.999	.375
.800	5.000	23.40	2.500	-91.60	-.070	-2.499	.400
.850	3.960	23.20	1.980	-91.80	-.062	-1.979	.425
.900	3.000	23.00	1.500	-92.00	-.052	-1.499	.450
.950	1.760	23.00	.880	-92.00	-.031	-.879	.475
.968	1.200	22.70	.600	-92.30	-.024	-.600	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

Z/H	RAW DATA QRMAG	QRFAZ	NORMALIZED DATA QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	9.997	-2.00	21.500	-2.00	21.487	-.750	.006
.050	7.403	-3.00	15.920	-3.00	15.898	-.833	.025
.100	6.547	-4.00	14.080	-4.00	14.046	-.982	.050
.150	5.952	-5.00	12.800	-5.00	12.751	-1.116	.075
.200	5.347	-6.20	11.500	-6.20	11.433	-1.242	.100
.250	4.603	-7.70	9.900	-7.70	9.811	-1.326	.125
.300	3.897	-9.20	8.380	-9.20	8.272	-1.340	.150
.350	3.199	-11.50	6.880	-11.50	6.742	-1.372	.175
.400	2.399	-15.10	5.160	-15.10	4.982	-1.344	.200
.450	1.497	-23.00	3.220	-23.00	2.964	-1.258	.225
.500	.623	-53.50	1.340	-53.50	.797	-1.077	.250
.550	.744	-142.50	1.600	-142.50	-1.269	-.974	.275
.600	1.618	-166.00	3.480	-166.00	-3.377	-.842	.300
.650	2.511	-173.10	5.400	-173.10	-5.361	-.649	.325
.700	3.404	-176.30	7.320	-176.30	-7.305	-.472	.350
.750	4.297	-178.60	9.240	-178.60	-9.237	-.226	.375
.800	4.845	-179.60	10.420	-179.60	-10.420	-.073	.400
.850	5.450	-180.50	11.720	-180.50	-11.720	.102	.425
.900	6.222	-181.10	13.380	-181.10	-13.378	.257	.450
.950	6.845	-181.60	14.720	-181.60	-14.714	.411	.475
.974	7.595	-181.80	16.340	-181.80	-16.332	.513	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0280 BETAL/BETAC = 1.016 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	RAW DATA IRMAG	IRFAZ	NORMALIZED DATA INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	2.902	182.00	1.440	67.00	.563	1.326	.003
.050	1.491	160.50	.740	45.50	.519	.528	.025
.100	1.007	97.60	.500	-17.40	.477	-.150	.050
.150	1.733	56.50	.860	-58.50	.449	-.733	.075
.200	2.821	41.60	1.400	-73.40	.400	-1.342	.100
.250	3.748	36.20	1.860	-78.80	.361	-1.825	.125
.300	4.473	33.10	2.220	-81.90	.313	-2.198	.150
.350	5.320	30.80	2.640	-84.20	.267	-2.626	.175
.400	5.964	29.20	2.960	-85.80	.217	-2.952	.200
.450	6.408	28.10	3.180	-86.90	.172	-3.175	.225
.500	6.730	27.40	3.340	-87.60	.140	-3.337	.250
.550	6.770	26.60	3.360	-88.40	.094	-3.359	.275
.600	6.609	26.30	3.280	-88.70	.074	-3.279	.300
.650	6.408	25.80	3.180	-89.20	.044	-3.180	.325
.700	6.005	25.00	2.980	-90.00	.000	-2.980	.350
.750	5.521	25.00	2.740	-90.00	.000	-2.740	.375
.800	4.675	24.60	2.320	-90.40	-.016	-2.320	.400
.850	3.748	24.60	1.860	-90.40	-.013	-1.860	.425
.900	2.821	24.40	1.400	-90.60	-.015	-1.400	.450
.950	1.652	24.40	.820	-90.60	-.009	-.820	.475
.968	1.128	24.40	.560	-90.60	-.006	-.560	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

Z/H	RAW DATA QRMAG	QRFAZ	NORMALIZED DATA QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	9.997	-3.00	21.500	-3.00	21.471	-1.125	.006
.050	7.347	-3.50	15.800	-3.50	15.771	-.965	.025
.100	6.352	-4.10	13.660	-4.10	13.625	-.977	.050
.150	5.682	-4.80	12.220	-4.80	12.177	-1.023	.075
.200	5.096	-5.80	10.960	-5.80	10.904	-1.108	.100
.250	4.417	-6.60	9.500	-6.60	9.437	-1.092	.125
.300	3.804	-7.70	8.180	-7.70	8.106	-1.096	.150
.350	3.153	-9.90	6.780	-9.90	6.679	-1.166	.175
.400	2.399	-12.40	5.160	-12.40	5.040	-1.108	.200
.450	1.516	-18.50	3.260	-18.50	3.092	-1.034	.225
.500	.688	-36.70	1.480	-36.70	1.187	-.884	.250
.550	.493	-130.80	1.060	-130.80	-.693	-.802	.275
.600	1.237	-164.40	2.660	-164.40	-2.562	-.715	.300
.650	2.111	-173.00	4.540	-173.00	-4.506	-.553	.325
.700	2.957	-176.30	6.360	-176.30	-6.347	-.410	.350
.750	3.804	-178.20	8.180	-178.20	-8.176	-.257	.375
.800	4.352	-179.60	9.360	-179.60	-9.360	-.065	.400
.850	5.003	-180.60	10.760	-180.60	-10.759	.113	.425
.900	5.803	-181.30	12.480	-181.30	-12.477	.283	.450
.950	6.445	-182.00	13.860	-182.00	-13.852	.484	.475
.974	7.217	-182.20	15.520	-182.20	-15.509	.596	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0310 BETAL/BETAC = 1.016 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .2800

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	4.377	170.60	2.060	50.60	1.308	1.592	.003
.017	3.145	154.60	1.480	34.60	1.218	.840	.025
.033	2.465	131.40	1.160	11.40	1.137	.229	.050
.050	2.295	100.50	1.080	-19.50	1.018	-.361	.075
.067	2.677	75.60	1.260	-44.40	.900	-.882	.100
.083	3.315	60.00	1.560	-60.00	.780	-1.351	.125
.100	3.995	50.70	1.880	-69.30	.665	-1.759	.150
.117	4.633	44.20	2.180	-75.80	.535	-2.113	.175
.133	5.142	39.60	2.420	-80.40	.404	-2.386	.200
.150	5.652	36.00	2.660	-84.00	.278	-2.645	.225
.167	5.950	32.80	2.800	-87.20	.137	-2.797	.250
.183	6.078	30.40	2.860	-89.60	.020	-2.860	.275
.200	6.035	28.10	2.840	-91.90	-.094	-2.838	.300
.217	5.908	25.90	2.780	-94.10	-.199	-2.773	.325
.233	5.695	23.60	2.680	-96.40	-.299	-2.663	.350
.250	5.227	21.60	2.460	-98.40	-.359	-2.434	.375
.267	4.802	19.00	2.260	-101.00	-.431	-2.218	.400
.283	4.165	16.20	1.960	-103.80	-.468	-1.903	.425
.300	3.400	12.00	1.600	-108.00	-.494	-1.522	.450
.317	2.762	7.30	1.300	-112.70	-.502	-1.199	.475
.333	1.827	-6.60	.860	-126.60	-.513	-.690	.500
.350	1.147	-34.00	.540	-154.00	-.485	-.237	.525
.367	1.062	-83.30	.500	-203.30	-.459	.198	.550
.383	1.572	-117.00	.740	-237.00	-.403	.621	.575
.400	2.380	-132.20	1.120	-252.20	-.342	1.066	.600
.417	3.102	-139.20	1.460	-259.20	-.274	1.434	.625
.433	3.782	-143.20	1.780	-263.20	-.211	1.767	.650
.450	4.377	-146.60	2.060	-266.60	-.122	2.056	.675
.467	4.887	-148.80	2.300	-268.80	-.048	2.299	.700
.483	5.312	-150.80	2.500	-270.80	.035	2.500	.725
.500	5.568	-152.50	2.620	-272.50	.114	2.618	.750
.517	5.695	-154.00	2.680	-274.00	.187	2.673	.775
.533	5.695	-155.20	2.680	-275.20	.243	2.669	.800
.550	5.482	-156.80	2.580	-276.80	.305	2.562	.825
.567	5.312	-158.40	2.500	-278.40	.365	2.473	.850
.583	4.845	-160.20	2.280	-280.20	.404	2.244	.875
.600	4.293	-162.50	2.020	-282.50	.437	1.972	.900
.617	3.697	-165.00	1.740	-285.00	.450	1.681	.925
.633	2.932	-169.60	1.380	-289.60	.463	1.300	.950
.650	2.252	-175.50	1.060	-295.50	.456	.957	.975
.667	1.445	-190.00	.680	-310.00	.437	.521	1.000
.683	.935	-224.50	.440	-344.50	.424	.118	1.025
.700	1.020	-277.30	.480	-397.30	.382	-.291	1.050
.717	1.657	-302.40	.780	-422.40	.361	-.691	1.075
.733	2.465	-314.50	1.160	-434.50	.310	-1.118	1.100
.750	3.188	-320.80	1.500	-440.80	.240	-1.481	1.125
.767	3.740	-323.70	1.760	-443.70	.193	-1.749	1.150
.783	4.377	-326.40	2.060	-446.40	.129	-2.056	1.175
.800	4.930	-328.20	2.320	-448.20	.073	-2.319	1.200
.817	5.355	-329.50	2.520	-449.50	.022	-2.520	1.225
.833	5.610	-330.40	2.640	-450.40	-.018	-2.640	1.250
.850	5.738	-331.80	2.700	-451.80	-.085	-2.699	1.275
.867	5.652	-332.40	2.660	-452.40	-.111	-2.658	1.300
.883	5.482	-333.20	2.580	-453.20	-.144	-2.576	1.325
.900	5.142	-333.80	2.420	-453.80	-.160	-2.415	1.350
.917	4.675	-334.70	2.200	-454.70	-.180	-2.193	1.375
.933	3.952	-334.80	1.860	-454.80	-.156	-1.853	1.400
.950	3.188	-335.20	1.500	-455.20	-.136	-1.494	1.425
.967	2.465	-335.50	1.160	-455.50	-.111	-1.155	1.450
.983	1.402	-335.50	.660	-455.50	-.063	-.657	1.475
.989	.935	-335.50	.440	-455.50	-.042	-.438	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	10.000	-5.00	20.000	-5.00	19.924	-1.743	.006
.017	7.400	-6.30	14.800	-6.30	14.711	-1.624	.025
.033	6.380	-8.10	12.760	-8.10	12.633	-1.798	.050
.050	5.800	-10.10	11.600	-10.10	11.420	-2.034	.075
.067	5.300	-12.70	10.600	-12.70	10.341	-2.330	.100
.083	4.750	-15.30	9.500	-15.30	9.163	-2.507	.125
.100	4.200	-18.30	8.400	-18.30	7.975	-2.638	.150
.117	3.600	-22.80	7.200	-22.80	6.637	-2.790	.175
.133	2.960	-28.40	5.920	-28.40	5.208	-2.816	.200
.150	2.350	-37.50	4.700	-37.50	3.729	-2.861	.225
.167	1.700	-53.00	3.400	-53.00	2.046	-2.715	.250
.183	1.320	-80.00	2.640	-80.00	.458	-2.600	.275
.200	1.350	-113.70	2.700	-113.70	-1.085	-2.472	.300
.217	1.760	-139.30	3.520	-139.30	-2.669	-2.295	.325
.233	2.340	-153.40	4.680	-153.40	-4.185	-2.096	.350
.250	2.940	-161.70	5.880	-161.70	-5.583	-1.846	.375
.267	3.500	-167.00	7.000	-167.00	-6.821	-1.575	.400
.283	3.920	-170.80	7.840	-170.80	-7.739	-1.253	.425
.300	4.300	-174.00	8.600	-174.00	-8.553	-.899	.450
.317	4.510	-176.00	9.020	-176.00	-8.998	-.629	.475
.333	4.670	-178.50	9.340	-178.50	-9.337	-.244	.500
.350	4.780	-180.20	9.560	-180.20	-9.560	.033	.525
.367	4.720	-182.00	9.440	-182.00	-9.434	.329	.550
.383	4.580	-184.00	9.160	-184.00	-9.138	.639	.575
.400	4.300	-185.80	8.600	-185.80	-8.556	.869	.600
.417	3.920	-187.70	7.840	-187.70	-7.769	1.050	.625
.433	3.480	-189.70	6.960	-189.70	-6.860	1.173	.650
.450	2.950	-193.00	5.900	-193.00	-5.749	1.327	.675
.467	2.350	-197.00	4.700	-197.00	-4.495	1.374	.700
.483	1.700	-205.00	3.400	-205.00	-3.081	1.437	.725
.500	1.070	-221.30	2.140	-221.30	-1.608	1.412	.750
.517	.690	-266.00	1.380	-266.00	-.096	1.377	.775
.533	.950	-314.00	1.900	-314.00	1.320	1.367	.800
.550	1.500	-335.70	3.000	-335.70	2.734	1.235	.825
.567	2.140	-345.50	4.280	-345.50	4.144	1.072	.850
.583	2.750	-350.70	5.500	-350.70	5.428	.889	.875
.600	3.250	-354.00	6.500	-354.00	6.464	.679	.900
.617	3.700	-356.50	7.400	-356.50	7.386	.452	.925
.633	4.050	-358.20	8.100	-358.20	8.096	.254	.950
.650	4.300	-359.70	8.600	-359.70	8.600	.045	.975
.667	4.500	-361.20	9.000	-361.20	8.998	-.188	1.000
.683	4.600	-362.50	9.200	-362.50	9.191	-.401	1.025
.700	4.600	-363.80	9.200	-363.80	9.180	-.610	1.050
.717	4.350	-365.00	8.700	-365.00	8.667	-.758	1.075
.733	4.050	-366.00	8.100	-366.00	8.056	-.847	1.100
.750	3.650	-367.50	7.300	-367.50	7.238	-.953	1.125
.767	3.150	-369.60	6.300	-369.60	6.212	-1.051	1.150
.783	2.740	-371.70	5.480	-371.70	5.366	-1.111	1.175
.800	2.150	-375.00	4.300	-375.00	4.153	-1.113	1.200
.817	1.470	-382.00	2.940	-382.00	2.726	-1.101	1.225
.833	.750	-399.50	1.500	-399.50	1.157	-.954	1.250
.850	.470	-472.00	.940	-472.00	-.352	-.872	1.275
.867	1.020	-518.00	2.040	-518.00	-1.89	-.764	1.300
.883	1.750	-529.00	3.500	-529.00	-3.436	-.668	1.325
.900	2.500	-535.00	5.000	-535.00	-4.981	-.436	1.350
.917	3.300	-538.00	6.600	-538.00	-6.596	-.230	1.375
.933	3.820	-539.7	7.640	-539.70	-7.640	-.040	1.400
.950	4.450	-541.5	8.900	-541.50	-8.897	.233	1.425
.967	5.150	-542.8	10.300	-542.80	-10.288	.503	1.450
.983	5.850	-544.0	11.700	-544.00	-11.672	.816	1.475
.991	6.580	-544.5	13.160	-544.50	-13.119	1.033	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0310　　BETAL/BETAO = 1.016　　H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ　　RE = .067　　D/LAMDAO = .2500

A.　MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	4.199	172.30	1.900	52.30	1.162	1.503	.003
.025	2.917	156.90	1.320	36.90	1.056	.793	.025
.050	2.122	130.00	.960	10.00	.945	.167	.050
.075	2.077	94.80	.940	-25.20	.851	-.400	.075
.100	2.608	69.70	1.180	-50.30	.754	-.908	.100
.125	3.315	55.30	1.500	-64.70	.641	-1.356	.125
.150	4.111	47.00	1.860	-73.00	.544	-1.779	.150
.175	4.818	41.20	2.180	-78.80	.423	-2.138	.175
.200	5.304	37.20	2.400	-82.80	.301	-2.381	.200
.225	5.790	34.20	2.620	-85.80	.192	-2.613	.225
.250	6.100	31.80	2.760	-88.20	.087	-2.759	.250
.275	6.232	29.80	2.820	-90.20	-.010	-2.820	.275
.300	6.232	27.80	2.820	-92.20	-.108	-2.818	.300
.325	6.011	25.90	2.720	-94.10	-.194	-2.713	.325
.350	5.790	24.10	2.620	-95.90	-.269	-2.606	.350
.375	5.304	22.20	2.400	-97.80	-.326	-2.378	.375
.400	4.685	20.20	2.120	-95.80	-.361	-2.089	.400
.425	4.022	17.60	1.820	-102.40	-.391	-1.778	.425
.450	3.227	13.60	1.460	-106.40	-.412	-1.401	.450
.475	2.431	7.70	1.100	-112.30	-.417	-1.018	.475
.500	1.547	-7.10	.700	-127.10	-.422	-.558	.500
.525	.928	-41.80	.420	-161.80	-.399	-.131	.525
.550	1.061	-96.70	.480	-218.70	-.375	.300	.550
.575	1.768	-124.30	.800	-244.30	-.347	.721	.575
.600	2.608	-136.00	1.180	-256.00	-.285	1.145	.600
.625	3.359	-140.60	1.520	-260.60	-.248	1.500	.625
.650	4.022	-143.90	1.820	-263.90	-.193	1.810	.650
.675	4.774	-146.00	2.160	-266.00	-.151	2.155	.675
.700	5.304	-147.60	2.400	-267.60	-.101	2.398	.700
.725	5.790	-149.00	2.620	-265.00	-.046	2.620	.725
.750	6.100	-149.80	2.760	-265.80	-.010	2.760	.750
.775	6.188	-150.80	2.800	-270.80	.039	2.800	.775
.800	5.967	-151.50	2.700	-271.50	.071	2.699	.800
.825	5.834	-152.70	2.640	-272.70	.124	2.637	.825
.850	5.525	-152.80	2.500	-272.80	.122	2.497	.850
.875	5.039	-153.50	2.280	-273.50	.139	2.276	.875
.900	4.332	-153.70	1.960	-273.70	.126	1.956	.900
.925	3.403	-153.70	1.540	-273.70	.099	1.537	.925
.950	2.652	-154.20	1.200	-274.20	.088	1.197	.950
.975	1.591	-154.00	.720	-274.00	.050	.718	.975
.984	1.105	-154.00	.500	-274.00	.035	.499	.984

B.　MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	10.042	-5.00	19.500	-5.00	19.426	-1.700	.006
.025	6.829	-6.10	13.260	-6.10	13.185	-1.409	.025
.050	6.376	-7.50	12.380	-7.50	12.274	-1.616	.050
.075	5.778	-9.60	11.220	-9.60	11.063	-1.871	.075
.100	5.222	-11.60	10.140	-11.60	9.933	-2.039	.100
.125	4.665	-13.40	9.060	-13.40	8.813	-2.100	.125
.150	4.068	-16.00	7.900	-16.00	7.594	-2.178	.150
.175	3.420	-20.20	6.640	-20.20	6.232	-2.293	.175
.200	2.771	-25.50	5.380	-25.50	4.856	-2.316	.200
.225	2.029	-34.60	3.940	-34.60	3.243	-2.237	.225
.250	1.411	-51.40	2.740	-51.40	1.709	-2.141	.250
.275	1.092	-85.20	2.120	-85.20	.177	-2.113	.275
.300	1.246	-125.80	2.420	-125.80	-1.416	-1.963	.300
.325	1.792	-148.80	3.480	-148.80	-2.977	-1.803	.325
.350	2.441	-160.10	4.740	-160.10	-4.457	-1.613	.350
.375	3.059	-166.70	5.940	-166.70	-5.781	-1.366	.375
.400	3.564	-170.70	6.920	-170.70	-6.829	-1.118	.400
.425	4.068	-173.80	7.900	-173.80	-7.854	-.853	.425
.450	4.419	-176.00	8.580	-176.00	-8.559	-.599	.450
.475	4.666	-177.80	9.060	-177.80	-9.053	-.348	.475
.500	4.820	-179.20	9.360	-179.20	-9.359	-.131	.500
.525	4.903	-180.90	9.520	-180.90	-9.519	.150	.525
.550	4.872	-182.20	9.460	-182.20	-9.453	.363	.550
.575	4.666	-183.60	9.060	-183.60	-9.042	.569	.575
.600	4.315	-185.00	8.380	-185.00	-8.348	.730	.600
.625	3.914	-186.10	7.600	-186.10	-7.557	.808	.625
.650	3.461	-187.60	6.720	-187.60	-6.661	.889	.650
.675	2.956	-190.00	5.740	-190.00	-5.653	.997	.675
.700	2.307	-192.50	4.480	-192.50	-4.374	.970	.700
.725	1.607	-198.20	3.120	-198.20	-2.964	.974	.725
.750	.803	-213.50	1.560	-213.50	-1.301	.861	.750
.775	.412	-281.00	.800	-281.00	.153	.785	.775
.800	.968	-359.00	1.880	-359.00	1.880	.033	.800
.825	1.741	-350.20	3.380	-350.20	3.331	.575	.825
.850	2.493	-355.00	4.840	-355.00	4.822	.422	.850
.875	3.265	-358.00	6.340	-358.00	6.336	.221	.875
.900	3.821	-359.70	7.420	-359.70	7.420	.039	.900
.925	4.367	-360.80	8.480	-360.80	8.479	-.118	.925
.950	5.119	-362.60	9.940	-362.60	9.930	-.451	.950
.975	5.778	-363.00	11.220	-363.00	11.205	-.587	.975
.987	6.530	-363.50	12.680	-363.50	12.656	-.774	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0310 BETAL/BETAC = 1.016 H/LAMDAO = .500

FREQUENCY = 300.00MHZ FE = .067 D/LAMDAO = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	3.759	172.00	1.700	52.00	1.097	1.340	.003
.050	2.545	154.20	1.140	34.20	.943	.641	.025
.100	1.677	121.50	.840	1.50	.840	.022	.050
.150	1.922	85.50	.860	-34.50	.709	-.487	.075
.200	2.727	63.50	1.220	-56.50	.673	-1.017	.100
.250	3.576	51.20	1.600	-68.80	.579	-1.492	.125
.300	4.157	45.30	1.860	-74.70	.491	-1.794	.150
.350	4.917	40.50	2.200	-79.50	.401	-2.163	.175
.400	5.498	37.40	2.460	-82.60	.317	-2.440	.200
.450	6. 35	35.00	2.700	-85.00	.235	-2.690	.225
.500	6.258	33.30	2.800	-86.70	.161	-2.735	.250
.550	6.303	31.60	2.820	-88.40	.079	-2.819	.275
.600	6.213	30.50	2.780	-89.50	.024	-2.780	.300
.650	6.[illegible]35	29.40	2.700	-90.60	-.028	-2.700	.325
.700	5.567	28.60	2.500	-91.40	-.061	-2.499	.350
.750	5.185	27.70	2.320	-92.30	-.093	-2.318	.375
.800	4.381	27.30	1.960	-92.70	-.092	-1.958	.400
.850	3.487	26.60	1.560	-93.40	-.093	-1.557	.425
.900	2.682	26.60	1.200	-93.40	-.071	-1.198	.450
.950	1.520	26.80	.680	-93.20	-.038	-.679	.475
.968	1.[illegible]73	26.80	.480	-93.20	-.027	-.479	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	1[illegible].[illegible]42	.00	19.500	.00	19.500	.000	.006
.050	7.282	-.80	14.140	-.80	14.139	-.197	.025
.100	6.273	-2.10	12.180	-2.10	12.172	-.446	.050
.150	5.675	-4.00	11.020	-4.00	10.993	-.769	.075
.200	5.119	-4.50	9.940	-4.50	9.909	-.780	.100
.250	4.419	-6.60	8.580	-6.60	8.523	-.986	.125
.300	3.821	-8.70	7.420	-8.70	7.335	-1.122	.150
.350	3.214	-11.50	6.240	-11.50	6.115	-1.244	.175
.400	2.565	-16.20	4.980	-16.20	4.782	-1.389	.200
.450	1.813	-25.20	3.520	-25.20	3.185	-1.499	.225
.500	1.051	-44.40	2.040	-44.40	1.458	-1.427	.250
.550	.731	-96.50	1.420	-96.50	-.161	-1.411	.275
.600	1.174	-141.20	2.280	-141.20	-1.777	-1.429	.300
.650	1.895	-158.20	3.680	-158.20	-3.417	-1.367	.325
.700	2.626	-165.10	5.100	-165.10	-4.929	-1.311	.350
.750	3.461	-169.60	6.720	-169.60	-6.610	-1.213	.375
.800	4.[illegible]17	-172.30	7.800	-172.30	-7.730	-1.045	.400
.850	4.666	-174.30	9.060	-174.30	-9.015	-.900	.425
.900	5.377	-175.80	10.440	-175.80	-10.412	-.765	.450
.950	6.128	-177.30	11.900	-177.30	-11.887	-.561	.475
.974	6.829	-177.80	13.260	-177.80	-13.250	-.509	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0660 BETAL/BETAC = 1.109 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	[illegible]	130.00	7.300	30.00	6.322	3.650	.003
.017	9.261	121.80	6.760	21.80	6.277	2.510	.025
.033	8.549	113.10	6.240	13.10	6.078	1.414	.050
.050	7.754	103.20	5.660	3.20	5.651	.316	.075
.067	7.014	92.00	5.120	-8.00	5.070	-.713	.100
.083	6.412	78.00	4.680	-22.00	4.339	-1.753	.125
.100	6.055	62.10	4.420	-37.90	3.488	-2.715	.150
.117	6.055	44.60	4.420	-55.40	2.510	-3.638	.175
.133	6.302	29.00	4.600	-71.00	1.498	-4.349	.200
.150	6.877	15.00	5.020	-85.00	.438	-5.001	.225
.167	7.453	4.00	5.440	-96.00	-.569	-5.410	.250
.183	8.110	-4.90	5.920	-104.90	-1.522	-5.721	.275
.200	8.604	-12.50	6.280	-112.50	-2.403	-5.802	.300
.217	9.042	-19.20	6.600	-119.20	-3.220	-5.761	.325
.233	9.398	-24.70	6.860	-124.70	-3.905	-5.640	.350
.250	9.453	-30.10	6.900	-130.10	-4.444	-5.278	.375
.267	9.398	-35.20	6.860	-135.20	-4.868	-4.834	.400
.283	9.097	-40.50	6.640	-140.50	-5.124	-4.224	.425
.300	8.494	-49.20	6.200	-149.20	-5.326	-3.175	.450
.317	7.754	-52.80	5.660	-152.80	-5.034	-2.587	.475
.333	7.069	-60.40	5.160	-160.40	-4.861	-1.731	.500
.350	5.891	-69.30	4.300	-169.30	-4.225	-.798	.525
.367	5.042	-81.00	3.680	-181.00	-3.679	.064	.550
.383	4.247	-97.50	3.100	-197.50	-2.957	.932	.575
.400	3.863	-117.90	2.820	-217.90	-2.225	1.732	.600
.417	3.891	-140.30	2.840	-240.30	-1.407	2.467	.625
.433	4.384	-159.60	3.200	-259.60	-.578	3.147	.650
.450	5.096	-174.40	3.720	-274.40	.285	3.709	.675
.467	5.891	-185.00	4.300	-285.00	1.113	4.153	.700
.483	6.713	-192.80	4.900	-292.80	1.899	4.517	.725
.500	7.398	-198.90	5.400	-298.90	2.610	4.728	.750
.517	7.946	-204.00	5.800	-304.00	3.243	4.808	.775
.533	8.302	-208.00	6.060	-308.00	3.731	4.775	.800
.550	8.412	-211.80	6.140	-311.80	4.092	4.577	.825
.567	8.330	-215.20	6.080	-315.20	4.314	4.284	.850
.583	8.001	-218.50	5.840	-318.50	4.374	3.870	.875
.600	7.398	-221.80	5.400	-321.80	4.244	3.339	.900
.617	6.603	-225.50	4.820	-325.50	3.972	2.730	.925
.633	5.644	-230.00	4.120	-330.00	3.568	2.060	.950
.650	4.713	-235.80	3.440	-335.80	3.138	1.410	.975
.667	3.589	-245.30	2.620	-345.30	2.534	.665	1.000
.683	2.548	-261.00	1.860	-361.00	1.860	-.032	1.025
.700	1.891	-291.30	1.380	-391.30	1.179	-.717	1.050
.717	2.028	-332.00	1.480	-432.00	.457	-1.408	1.075
.733	2.932	-359.70	2.140	-459.70	-.361	-2.109	1.100
.750	3.946	-372.00	2.880	-472.00	-1.079	-2.670	1.125
.767	4.905	-379.00	3.580	-479.00	-1.736	-3.131	1.150
.783	5.946	-383.80	4.340	-483.80	-2.414	-3.606	1.175
.800	6.795	-387.20	4.960	-487.20	-2.999	-3.951	1.200
.817	7.398	-389.60	5.400	-489.60	-3.442	-4.161	1.225
.833	8.001	-391.10	5.840	-491.10	-3.839	-4.401	1.250
.850	8.056	-392.80	5.880	-492.80	-3.995	-4.314	1.275
.867	7.891	-393.70	5.760	-493.70	-3.979	-4.164	1.300
.883	7.672	-395.00	5.600	-495.00	-3.960	-3.960	1.325
.900	7.206	-395.80	5.260	-495.80	-3.771	-3.667	1.350
.917	6.494	-396.60	4.740	-496.60	-3.444	-3.257	1.375
.933	5.453	-396.60	3.980	-496.60	-2.892	-2.735	1.400
.950	4.274	-396.80	3.120	-496.80	-2.274	-2.136	1.425
.967	3.261	-397.10	2.380	-497.10	-1.743	-1.620	1.450
.983	1.945	-397.20	1.420	-497.20	-1.042	-.965	1.475
.989	1.288	-398.00	.940	-498.00	-.699	-.629	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	8.467	-.40	26.880	-.40	26.879	-.188	.006
.017	7.459	-10.00	23.680	-10.00	23.320	-4.112	.025
.033	7.560	-19.70	24.000	-19.70	22.595	-8.090	.050
.050	7.913	-27.30	25.120	-27.30	22.322	-11.521	.075
.067	8.165	-34.70	25.920	-34.70	21.310	-14.756	.100
.083	8.366	-41.40	26.560	-41.40	19.923	-17.564	.125
.100	8.417	-47.60	26.720	-47.60	18.017	-19.732	.150
.117	8.316	-53.70	26.400	-53.70	15.629	-21.277	.175
.133	7.913	-59.70	25.120	-59.70	12.674	-21.688	.200
.150	7.560	-66.30	24.000	-66.30	9.647	-21.976	.225
.167	6.804	-73.00	21.600	-73.00	6.315	-20.656	.250
.183	6.048	-81.20	19.200	-81.20	2.937	-18.974	.275
.200	5.393	-90.90	17.120	-90.90	-.269	-17.118	.300
.217	4.738	-103.70	15.040	-103.70	-3.562	-14.612	.325
.233	4.353	-119.50	13.820	-119.50	-6.805	-12.028	.350
.250	4.133	-138.20	13.120	-138.20	-9.781	-8.745	.375
.267	4.252	-157.00	13.500	-157.00	-12.427	-5.275	.400
.283	4.637	-173.40	14.720	-173.40	-14.622	-1.692	.425
.300	5.141	-187.20	16.320	-187.20	-16.191	2.045	.450
.317	5.846	-198.00	18.560	-198.00	-17.652	5.735	.475
.333	6.350	-206.20	20.160	-206.20	-18.089	8.901	.500
.350	6.754	-212.80	21.440	-212.80	-18.022	11.614	.525
.367	7.056	-218.40	22.400	-218.40	-17.555	13.914	.550
.383	7.276	-223.40	23.100	-223.40	-16.784	15.872	.575
.400	7.358	-227.80	23.360	-227.80	-15.691	17.305	.600
.417	7.157	-232.10	22.720	-232.10	-13.957	17.928	.625
.433	6.804	-236.30	21.600	-236.30	-11.985	17.970	.650
.450	6.451	-241.00	20.480	-241.00	-9.929	17.912	.675
.467	5.796	-246.00	18.400	-246.00	-7.484	16.809	.700
.483	4.920	-252.40	15.620	-252.40	-4.723	14.889	.725
.500	4.133	-261.00	13.120	-261.00	-2.052	12.958	.750
.517	3.326	-273.60	10.560	-273.60	.663	10.539	.775
.533	2.671	-292.60	8.480	-292.60	3.259	7.829	.800
.550	2.369	-320.50	7.520	-320.50	5.803	4.783	.825
.567	2.633	-348.70	8.360	-348.70	8.198	1.638	.850
.583	3.226	-368.60	10.240	-368.60	10.125	-1.531	.875
.600	4.032	-381.40	12.800	-381.40	11.918	-4.670	.900
.617	4.788	-389.30	15.200	-389.30	13.255	-7.439	.925
.633	5.342	-395.00	16.960	-395.00	13.893	-9.728	.950
.650	5.897	-399.30	18.720	-399.30	14.486	-11.857	.975
.667	6.250	-402.60	19.840	-402.60	14.604	-13.429	1.000
.683	6.602	-405.50	20.960	-405.50	14.691	-14.950	1.025
.700	6.703	-408.00	21.280	-408.00	14.239	-15.814	1.050
.717	6.602	-410.10	20.960	-410.10	13.445	-16.080	1.075
.733	6.300	-412.20	20.000	-412.20	12.258	-15.803	1.100
.750	5.494	-414.30	17.440	-414.30	10.177	-14.163	1.125
.767	5.040	-416.50	16.000	-416.50	8.831	-13.342	1.150
.783	4.334	-419.20	13.760	-419.20	7.046	-11.819	1.175
.800	3.478	-423.00	11.040	-423.00	5.012	-9.837	1.200
.817	2.470	-429.60	7.840	-429.60	2.733	-7.348	1.225
.833	1.329	-445.80	4.220	-445.80	.309	-4.209	1.250
.850	.743	-503.80	2.360	-503.80	-1.904	-1.394	1.275
.867	1.392	-559.70	4.420	-559.70	-4.161	1.490	1.300
.883	2.419	-575.30	7.680	-575.30	-6.268	4.438	1.325
.900	3.528	-581.40	11.200	-581.40	-8.401	7.407	1.350
.917	4.536	-584.40	14.400	-584.40	-10.288	10.075	1.375
.933	5.141	-586.40	16.320	-586.40	-11.255	11.818	1.400
.950	5.846	-587.60	18.560	-587.60	-12.515	13.706	1.425
.967	6.552	-588.30	20.800	-588.30	-13.837	15.530	1.450
.983	7.308	-588.80	23.200	-588.80	-15.282	17.456	1.470
.991	8.014	-589.00	25.440	-589.00	-16.690	19.200	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0660 BETAL/BETAC = 1.109 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA NORMALIZED DATA

Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	9.414	158.50	5.740	38.50	4.492	3.573	.003
.025	7.905	150.00	4.820	30.00	4.174	2.410	.025
.050	6.691	138.40	4.080	18.40	3.871	1.288	.050
.075	5.609	123.00	3.420	3.00	3.415	.179	.075
.100	4.953	103.20	3.020	-16.80	2.891	-.873	.100
.125	4.887	80.80	2.980	-39.20	2.309	-1.883	.125
.150	5.412	59.20	3.300	-60.80	1.610	-2.881	.150
.175	6.396	42.60	3.900	-77.40	.851	-3.806	.175
.200	7.511	31.30	4.580	-88.70	.104	-4.579	.200
.225	8.692	23.10	5.300	-96.90	-.637	-5.262	.225
.250	9.610	17.30	5.860	-102.70	-1.288	-5.717	.250
.275	10.365	12.30	6.320	-107.70	-1.921	-6.021	.275
.300	10.890	8.70	6.640	-111.30	-2.412	-6.186	.300
.325	11.021	4.70	6.720	-115.30	-2.872	-6.075	.325
.350	11.021	1.70	6.720	-118.30	-3.186	-5.917	.350
.375	10.594	-1.60	6.460	-121.60	-3.385	-5.502	.375
.400	9.807	-4.90	5.980	-124.90	-3.421	-4.905	.400
.425	8.790	-8.60	5.360	-128.60	-3.344	-4.189	.425
.450	7.610	-12.80	4.640	-132.80	-3.153	-3.405	.450
.475	6.298	-18.50	3.840	-138.50	-2.876	-2.544	.475
.500	4.756	-28.20	2.900	-148.20	-2.465	-1.528	.500
.525	3.346	-43.20	2.040	-163.20	-1.953	-.590	.525
.550	2.427	-74.70	1.480	-194.70	-1.432	.376	.550
.575	2.558	-115.70	1.560	-235.70	-.879	1.289	.575
.600	3.739	-143.80	2.280	-263.80	-.246	2.267	.600
.625	5.215	-156.40	3.180	-276.40	.354	3.160	.625
.650	6.265	-163.00	3.820	-283.00	.859	3.722	.650
.675	7.610	-167.60	4.640	-287.60	1.403	4.423	.675
.700	8.692	-170.60	5.300	-290.60	1.865	4.961	.700
.725	9.610	-173.00	5.860	-293.00	2.290	5.394	.725
.750	10.102	-174.20	6.160	-294.20	2.525	5.619	.750
.775	10.365	-175.80	6.320	-295.80	2.751	5.690	.775
.800	10.004	-177.10	6.100	-297.10	2.779	5.430	.800
.825	9.840	-178.20	6.000	-298.20	2.835	5.288	.825
.850	9.217	-179.00	5.620	-299.00	2.725	4.915	.850
.875	8.266	-179.50	5.040	-299.50	2.482	4.387	.875
.900	6.855	-179.60	4.180	-299.60	2.065	3.634	.900
.925	5.412	-180.00	3.300	-300.00	1.650	2.858	.925
.950	4.002	-180.30	2.440	-300.30	1.231	2.107	.950
.975	2.296	-180.50	1.400	-300.50	.711	1.206	.975
.984	1.509	-180.70	.920	-300.70	.470	.791	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA NORMALIZED DATA

Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	9.938	5.00	26.500	5.00	26.399	2.310	.006
.025	8.767	-.70	23.380	-.70	23.378	-.286	.025
.050	9.045	-6.50	24.120	-6.50	23.965	-2.730	.050
.075	9.195	-11.60	24.520	-11.60	24.019	-4.930	.075
.100	9.292	-16.00	24.780	-16.00	23.820	-6.830	.100
.125	9.090	-20.70	24.240	-20.70	22.675	-8.568	.125
.150	8.797	-24.70	23.460	-24.70	21.314	-9.803	.150
.175	8.445	-29.20	22.520	-29.20	19.658	-10.987	.175
.200	7.552	-33.40	20.140	-33.40	16.814	-11.087	.200
.225	6.360	-39.90	16.960	-39.90	13.011	-10.879	.225
.250	5.318	-47.70	14.180	-47.70	9.543	-10.488	.250
.275	4.290	-59.50	11.440	-59.50	5.806	-9.857	.275
.300	3.382	-78.10	9.020	-78.10	1.860	-8.826	.300
.325	2.940	-106.30	7.840	-106.30	-2.200	-7.525	.325
.350	3.277	-135.20	8.740	-135.20	-6.202	-6.158	.350
.375	4.073	-156.00	10.860	-156.00	-9.921	-4.417	.375
.400	5.017	-169.10	13.380	-169.10	-13.139	-2.530	.400
.425	6.015	-177.60	16.040	-177.60	-16.026	-.672	.425
.450	7.005	-183.20	18.680	-183.20	-18.651	1.043	.450
.475	7.702	-187.90	20.540	-187.90	-20.345	2.823	.475
.500	8.100	-191.40	21.600	-191.40	-21.174	4.269	.500
.525	8.497	-194.30	22.660	-194.30	-21.958	5.597	.525
.550	8.595	-196.60	22.920	-196.60	-21.965	6.548	.550
.575	8.400	-198.70	22.400	-198.70	-21.218	7.182	.575
.600	8.047	-200.70	21.460	-200.70	-20.075	7.586	.600
.625	7.252	-203.00	19.340	-203.00	-17.803	7.557	.625
.650	6.457	-205.10	17.220	-205.10	-15.594	7.305	.650
.675	5.617	-207.90	14.980	-207.90	-13.239	7.010	.675
.700	4.470	-211.50	11.920	-211.50	-10.163	6.228	.700
.725	3.082	-217.80	8.220	-217.80	-6.495	5.038	.725
.750	1.717	-233.50	4.580	-233.50	-2.724	3.682	.750
.775	.960	-290.00	2.560	-290.00	.876	2.406	.775
.800	1.740	-347.50	4.640	-347.50	4.530	1.004	.800
.825	3.030	-363.30	8.080	-363.30	8.067	-.465	.825
.850	4.717	-370.90	12.580	-370.90	12.353	-2.379	.850
.875	5.715	-372.70	15.240	-372.70	14.867	-3.350	.875
.900	6.457	-374.30	17.220	-374.30	16.686	-4.253	.900
.925	7.357	-375.60	19.620	-375.60	18.897	-5.276	.925
.950	8.347	-376.30	22.260	-376.30	21.365	-6.248	.950
.975	9.240	-376.80	24.640	-376.80	23.588	-7.122	.975
.987	9.738	-377.00	26.500	-377.00	25.342	-7.748	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0407 BETAL/BETAC = 1.047 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	6.116	160.60	3.740	45.60	2.617	2.672	.003
.017	6.814	149.30	3.140	34.30	2.594	1.769	.025
.033	5.685	134.50	2.620	19.50	2.470	.875	.050
.050	4.948	115.60	2.280	.60	2.280	.024	.075
.067	4.774	92.90	2.200	-22.10	2.038	-.828	.100
.083	5.204	81.50	2.400	-33.50	2.001	-1.325	.125
.100	6.033	55.10	2.780	-59.90	1.394	-2.405	.150
.117	7.248	42.80	3.340	-72.20	1.021	-3.180	.175
.133	8.246	34.40	3.800	-80.60	.621	-3.749	.200
.150	9.331	27.90	4.300	-87.10	.218	-4.294	.225
.167	10.069	22.60	4.640	-92.40	-.194	-4.636	.250
.183	10.763	18.40	4.960	-96.60	-.570	-4.927	.275
.200	10.980	14.60	5.060	-100.40	-.913	-4.977	.300
.217	11.110	11.10	5.120	-103.90	-1.230	-4.970	.325
.233	11.197	7.90	5.160	-107.10	-1.517	-4.932	.350
.250	10.676	4.40	4.920	-110.60	-1.731	-4.605	.375
.267	10.242	1.00	4.720	-114.00	-1.920	-4.312	.400
.283	9.288	-3.00	4.280	-118.00	-2.009	-3.779	.425
.300	8.072	-7.80	3.720	-122.80	-2.015	-3.127	.450
.317	6.857	-14.00	3.160	-129.00	-1.989	-2.456	.475
.333	5.642	-23.10	2.600	-138.10	-1.935	-1.736	.500
.350	4.210	-38.00	1.940	-153.00	-1.729	-.881	.525
.367	3.342	-61.80	1.540	-176.80	-1.538	-.086	.550
.383	3.212	-94.40	1.480	-209.40	-1.289	.727	.575
.400	3.949	-120.90	1.820	-235.90	-1.020	1.507	.600
.417	5.078	-137.50	2.340	-252.50	-.704	2.232	.625
.433	6.380	-147.20	2.940	-262.20	-.399	2.913	.650
.450	7.595	-153.60	3.500	-268.60	-.086	3.499	.675
.467	8.637	-158.30	3.980	-273.30	.229	3.973	.700
.483	9.635	-161.70	4.440	-276.70	.518	4.410	.725
.500	10.112	-164.50	4.660	-279.50	.769	4.596	.750
.517	10.590	-167.10	4.880	-282.10	1.023	4.772	.775
.533	10.763	-169.30	4.960	-284.30	1.225	4.806	.800
.550	10.720	-171.30	4.940	-286.30	1.386	4.741	.825
.567	10.286	-173.20	4.740	-288.20	1.480	4.503	.850
.583	9.591	-175.10	4.420	-290.10	1.519	4.151	.875
.600	8.637	-177.70	3.980	-292.70	1.536	3.672	.900
.617	7.421	-180.40	3.420	-295.40	1.467	3.089	.925
.633	6.033	-184.50	2.780	-299.50	1.369	2.420	.950
.650	4.557	-190.50	2.100	-305.50	1.219	1.710	.975
.667	2.995	-202.10	1.380	-317.10	1.011	.939	1.000
.683	1.823	-232.20	.840	-347.20	.819	.186	1.025
.700	1.823	-291.10	.840	-406.10	.582	-.605	1.050
.717	3.125	-321.60	1.440	-436.60	.334	-1.401	1.075
.733	4.514	-333.00	2.080	-448.00	.073	-2.079	1.100
.750	6.119	-339.20	2.820	-454.20	-.207	-2.812	1.125
.767	7.508	-342.30	3.460	-457.30	-.440	-3.432	1.150
.783	8.506	-343.80	3.920	-458.80	-.600	-3.874	1.175
.800	9.591	-346.30	4.420	-461.30	-.866	-4.334	1.200
.817	10.373	-347.60	4.780	-462.60	-1.043	-4.665	1.225
.833	10.763	-348.40	4.960	-463.40	-1.149	-4.825	1.250
.850	10.763	-349.10	4.960	-464.10	-1.208	-4.811	1.275
.867	10.503	-349.90	4.840	-464.90	-1.245	-4.677	1.300
.883	10.069	-350.60	4.640	-465.60	-1.248	-4.469	1.325
.900	9.505	-350.80	4.380	-465.80	-1.193	-4.215	1.350
.917	8.550	-351.10	3.940	-466.10	-1.093	-3.785	1.375
.933	7.118	-351.60	3.280	-466.60	-.937	-3.143	1.400
.950	5.642	-351.60	2.600	-466.60	-.743	-2.492	1.425
.967	4.210	-351.80	1.940	-466.80	-.561	-1.857	1.450
.983	2.387	-351.90	1.100	-466.90	-.320	-1.052	1.475
.989	1.519	-351.90	.700	-466.90	-.203	-.670	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	10.005	2.50	23.000	2.50	22.978	1.003	.006
.017	8.404	-2.10	19.320	-2.10	19.307	-.708	.025
.033	8.152	-6.40	18.740	-6.40	18.623	-2.089	.050
.050	8.108	-10.40	18.640	-10.40	18.334	-3.365	.075
.067	8.056	-14.60	18.520	-14.60	17.922	-4.668	.100
.083	7.726	-18.40	17.760	-18.40	16.852	-5.606	.125
.100	7.308	-22.70	16.800	-22.70	15.499	-6.483	.150
.117	6.751	-27.40	15.520	-27.40	13.779	-7.142	.175
.133	6.003	-32.20	13.800	-32.20	11.677	-7.354	.200
.150	5.255	-39.20	12.080	-39.20	9.361	-7.635	.225
.167	4.306	-48.50	9.900	-48.50	6.560	-7.415	.250
.183	3.480	-62.20	8.000	-62.20	3.731	-7.077	.275
.200	2.880	-81.80	6.620	-81.80	.944	-6.552	.300
.217	2.714	-108.50	6.240	-108.50	-1.980	-5.918	.325
.233	3.080	-132.60	7.080	-132.60	-4.792	-5.212	.350
.250	3.802	-150.80	8.740	-150.80	-7.629	-4.264	.375
.267	4.707	-162.40	10.820	-162.40	-10.314	-3.272	.400
.283	5.490	-170.60	12.620	-170.60	-12.451	-2.061	.425
.300	6.151	-176.30	14.140	-176.30	-14.111	-.912	.450
.317	6.803	-180.70	15.640	-180.70	-15.639	.191	.475
.333	7.151	-184.50	16.440	-184.50	-16.389	1.290	.500
.350	7.421	-187.70	17.060	-187.70	-16.906	2.286	.525
.367	7.586	-190.50	17.440	-190.50	-17.148	3.178	.550
.383	7.482	-193.20	17.200	-193.20	-16.746	3.928	.575
.400	7.256	-196.00	16.680	-196.00	-16.034	4.598	.600
.417	6.821	-199.00	15.680	-199.00	-14.826	5.105	.625
.433	6.281	-201.90	14.440	-201.90	-13.398	5.386	.650
.450	5.551	-205.90	12.760	-205.90	-11.478	5.574	.675
.467	4.707	-210.60	10.820	-210.60	-9.313	5.508	.700
.483	3.706	-217.80	8.520	-217.80	-6.732	5.222	.725
.500	2.723	-230.10	6.260	-230.10	-4.015	4.802	.750
.517	1.931	-254.00	4.440	-254.00	-1.224	4.268	.775
.533	1.662	-294.50	3.820	-294.50	1.584	3.476	.800
.550	2.332	-329.10	5.360	-329.10	4.599	2.753	.825
.567	3.202	-345.00	7.360	-345.00	7.109	1.905	.850
.583	4.080	-353.90	9.380	-353.90	9.327	.997	.875
.600	5.002	-359.20	11.500	-359.20	11.499	.161	.900
.617	5.751	-363.20	13.220	-363.20	13.199	-.738	.925
.633	6.455	-365.90	14.840	-365.90	14.761	-1.528	.950
.650	6.908	-368.10	15.880	-368.10	15.722	-2.238	.975
.667	7.221	-369.80	16.600	-369.80	16.358	-2.825	1.000
.683	7.456	-371.40	17.140	-371.40	16.802	-3.388	1.025
.700	7.404	-373.10	17.020	-373.10	16.577	-3.858	1.050
.717	7.186	-374.50	16.520	-374.50	15.994	-4.134	1.075
.733	6.708	-375.90	15.420	-375.90	14.830	-4.224	1.100
.750	6.003	-377.10	13.800	-377.10	13.190	-4.058	1.125
.767	5.203	-378.50	11.960	-378.50	11.342	-3.795	1.150
.783	4.306	-380.50	9.900	-380.50	9.273	-3.467	1.175
.800	3.349	-384.00	7.700	-384.00	7.034	-3.132	1.200
.817	2.227	-389.30	5.120	-389.30	4.465	-2.506	1.225
.833	.974	-407.90	2.240	-407.90	1.502	-1.662	1.250
.850	.705	-501.50	1.620	-501.50	-1.268	-1.008	1.275
.867	1.749	-535.70	4.020	-535.70	-4.009	-.301	1.300
.883	2.941	-543.90	6.760	-543.90	-6.744	.460	1.325
.900	4.106	-547.20	9.440	-547.20	-9.364	1.183	1.350
.917	5.255	-549.00	12.080	-549.00	-11.931	1.890	1.375
.933	5.951	-550.00	13.680	-550.00	-13.978	2.376	1.400
.950	6.708	-550.80	15.420	-550.80	-15.147	2.889	1.425
.967	7.604	-551.40	17.480	-551.40	-17.135	3.455	1.450
.983	8.387	-551.90	19.280	-551.90	-18.866	3.976	1.475
.991	9.405	-552.00	21.620	-552.00	-21.148	4.495	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0907 BETAL/BETAO = 1.047 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	6.[illegible]3	168.40	2.760	53.40	1.646	2.216	.003
.025	4.394	153.70	2.020	38.70	1.576	1.263	.025
.050	3.349	129.90	1.540	14.90	1.488	.396	.050
.075	3.[illegible]88	96.20	1.420	-18.80	1.344	-.458	.075
.100	3.915	67.80	1.800	-47.20	1.223	-1.321	.100
.125	5.[illegible]93	51.10	2.340	-63.90	1.029	-2.101	.125
.150	6.395	41.20	2.940	-73.80	.820	-2.823	.150
.175	7.656	34.70	3.520	-80.30	.593	-3.470	.175
.200	8.744	30.00	4.020	-85.00	.350	-4.005	.200
.225	9.744	26.90	4.460	-88.10	.149	-4.478	.225
.250	10.527	23.70	4.840	-91.30	-.110	-4.839	.250
.275	10.527	21.40	4.840	-93.60	-.304	-4.830	.275
.300	11.049	19.30	5.080	-95.70	-.505	-5.055	.300
.325	11.005	17.30	5.060	-97.70	-.678	-5.014	.325
.350	10.657	15.40	4.900	-95.60	-.817	-4.831	.350
.375	9.788	13.20	4.500	-101.80	-.920	-4.405	.375
.400	8.918	10.90	4.100	-104.10	-.999	-3.976	.400
.425	7.613	8.20	3.500	-106.80	-1.012	-3.351	.425
.450	6.264	4.40	2.880	-110.60	-1.013	-2.696	.450
.475	4.654	-1.40	2.140	-116.40	-.952	-1.917	.475
.500	2.914	-13.30	1.340	-128.30	-.831	-1.052	.500
.525	1.696	-47.00	.780	-162.00	-.742	-.241	.525
.550	1.827	-107.10	.840	-222.10	-.623	.563	.550
.575	3.219	-135.50	1.480	-250.50	-.494	1.395	.575
.600	4.654	-145.70	2.140	-260.70	-.346	2.112	.600
.625	6.221	-151.70	2.860	-266.70	-.165	2.855	.625
.650	7.613	-153.70	3.500	-268.70	-.079	3.499	.650
.675	8.570	-156.40	3.940	-271.40	.096	3.939	.675
.700	9.700	-157.90	4.460	-272.90	.226	4.454	.700
.725	10.397	-158.60	4.780	-273.60	.300	4.771	.725
.750	10.919	-159.80	5.020	-274.80	.420	5.002	.750
.775	10.788	-160.60	4.960	-275.60	.484	4.936	.775
.800	10.397	-161.20	4.780	-276.20	.516	4.752	.800
.825	10.005	-162.10	4.600	-277.10	.569	4.565	.825
.850	9.526	-162.30	4.380	-277.30	.557	4.344	.850
.875	8.613	-162.50	3.960	-277.50	.517	3.926	.875
.900	7.091	-163.10	3.260	-278.10	.459	3.227	.900
.925	5.611	-163.10	2.580	-278.10	.364	2.554	.925
.950	4.132	-163.10	1.900	-278.10	.268	1.881	.950
.975	2.349	-163.10	1.080	-278.10	.152	1.069	.975
.984	1.523	-163.10	.700	-278.10	.099	.693	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.006	10.[illegible]12	.00	22.500	.00	22.[illegible]	.000	.006
.025	8.161	-2.50	18.340	-2.50	18.3[illegible]	-.800	.025
.050	7.912	-5.10	17.760	-5.10	17.710	-1.581	.050
.075	7.663	-8.00	17.220	-8.00	17.05[illegible]	-2.397	.075
.100	7.414	-10.60	16.660	-10.60	16.376	-3.065	.100
.125	6.9[illegible]6	-13.20	15.520	-13.20	15.110	-3.544	.125
.150	6.3[illegible]	-16.40	14.180	-16.40	13.603	-4.004	.150
.175	5.[illegible]54	-20.00	12.480	-20.00	11.727	-4.268	.175
.200	4.655	-25.10	10.460	-25.10	9.472	-4.437	.200
.225	3.756	-32.20	8.440	-32.20	7.142	-4.497	.225
.250	2.732	-43.10	6.140	-43.10	4.[illegible]83	-4.195	.250
.275	1.922	-66.50	4.320	-66.50	1.[illegible]23	-3.962	.275
.300	1.655	-107.60	3.720	-107.60	-1.[illegible]5	-3.546	.300
.325	2.269	-142.00	5.100	-142.00	-4.[illegible]	-3.140	.325
.350	3.213	-159.00	7.220	-159.00	-6.7[illegible]0	-2.587	.350
.375	4.236	-168.20	9.520	-168.20	-9.319	-1.947	.375
.400	5.109	-173.50	11.480	-173.50	-11.406	-1.300	.400
.425	5.[illegible]1[illegible]	-177.40	13.260	-177.40	-13.266	-.602	.425
.450	6.613	-180.30	14.860	-180.30	-14.860	.078	.450
.475	7.307	-183.60	16.420	-183.60	-16.388	1.031	.475
.500	7.360	-184.00	16.540	-184.00	-16.500	1.154	.500
.525	7.494	-185.10	16.840	-185.10	-16.773	1.497	.525
.550	7.360	-186.60	16.540	-186.60	-16.430	1.901	.550
.575	7.191	-188.00	16.160	-188.00	-16.003	2.249	.575
.600	6.613	-189.20	14.860	-189.20	-14.669	2.376	.600
.625	6.007	-190.20	13.500	-190.20	-13.287	2.391	.625
.650	5.26[illegible]	-191.70	11.820	-191.70	-11.574	2.397	.650
.675	4.254	-193.80	9.560	-193.80	-9.284	2.280	.675
.700	3.302	-196.90	7.420	-196.90	-7.100	2.157	.700
.725	2.163	-202.30	4.860	-202.30	-4.497	1.844	.725
.750	.908	-222.70	2.040	-222.70	-1.499	1.383	.750
.775	.703	-320.60	1.580	-320.60	1.221	1.003	.775
.800	1.753	-351.30	3.940	-351.30	3.895	.596	.800
.825	2.910	-359.00	6.540	-359.00	6.539	.114	.825
.850	4.085	-361.60	9.180	-361.60	9.176	-.256	.850
.875	5.207	-363.20	11.700	-363.20	11.682	-.653	.875
.900	5.91[illegible]	-364.40	13.280	-364.40	13.241	-1.019	.900
.925	6.657	-365.00	14.960	-365.00	14.903	-1.304	.925
.950	7.603	-365.50	17.100	-365.50	17.021	-1.639	.950
.975	8.313	-365.90	18.680	-365.90	18.581	-1.920	.975
.987	9.309	-366.00	20.920	-366.00	20.805	-2.187	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTIØN ØF CURRENT AND CHARGE ØN MØNØPØLE ANTENNA ØVER SALT WATER

ALFAL/BETAL = .0660 BETAL/BETAC = 1.109 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0100

A. MEASURED CURRENT DISTRIBUTIØN IN MA/VØLT

	RAW DATA		NØRMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
[illegible]	[illegible]	171.70	2.830	56.70	1.581	2.407	.003
.050	3.547	157.20	2.060	42.20	1.526	1.384	.025
.100	[illegible]	125.20	1.460	10.20	1.437	.259	.050
.150	[illegible]	83.20	1.500	-31.80	1.275	-.790	.075
.200	3.443	55.40	2.120	-55.60	1.073	-1.829	.100
.250	[illegible]	42.00	2.940	-73.00	.871	-2.850	.125
.300	5.175	34.40	3.600	-80.60	.621	-3.749	.150
.350	[illegible]	29.50	4.460	-85.50	.351	-4.466	.175
.400	[illegible]	26.40	5.180	-88.60	.127	-5.178	.200
.450	[illegible]	24.00	5.700	-91.00	-.099	-5.699	.225
.500	[illegible]	22.40	6.140	-92.60	-.279	-6.134	.250
.550	[illegible]	20.90	6.260	-94.10	-.448	-6.244	.275
.600	[illegible]	20.10	6.120	-94.90	-.523	-6.098	.300
.650	[illegible]	19.20	5.960	-95.80	-.602	-5.929	.325
.700	9.135	18.50	5.560	-96.50	-.629	-5.524	.350
.750	9.125	17.70	5.000	-97.30	-.635	-4.959	.375
.800	6.793	17.50	4.160	-97.50	-.546	-4.144	.400
.850	5.297	17.20	3.260	-97.80	-.442	-3.230	.425
.900	3.497	16.80	2.460	-98.20	-.351	-2.435	.450
.950	[illegible]	16.30	1.400	-98.70	-.212	-1.384	.475
.968	1.445	16.30	.920	-98.70	-.139	-.909	.484

B. MEASURED CHARGE DISTRIBUTIØN IN PICCØUL/VØLT-M

	RAW DATA		NØRMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.012	[illegible]	.00	26.500	.00	26.500	.000	.006
.050	[illegible]	-2.10	22.660	-2.10	22.645	-.830	.025
.100	[illegible]	-4.50	22.120	-4.50	22.052	-1.736	.050
.150	[illegible]	-6.90	21.460	-6.50	21.305	-2.578	.075
.200	[illegible]	-9.00	20.280	-9.00	20.030	-3.172	.100
.250	[illegible]	-10.70	18.560	-10.70	18.237	-3.446	.125
.300	[illegible]	-12.50	16.560	-12.50	16.142	-3.697	.150
.350	[illegible]	-16.00	14.560	-16.00	14.015	-4.019	.175
.400	[illegible]	-19.40	11.520	-19.40	10.866	-3.826	.200
.450	[illegible]	-25.80	8.080	-25.80	7.275	-3.517	.225
.500	[illegible]	-39.10	4.500	-39.10	3.492	-2.838	.250
.550	.92	-96.50	2.360	-96.50	-.269	-2.365	.275
.600	[illegible]	-155.10	4.400	-155.10	-3.991	-1.853	.300
.650	[illegible]	-171.10	7.800	-171.10	-7.706	-1.207	.325
.700	[illegible]	-177.50	11.520	-177.50	-11.509	-.502	.350
.750	[illegible]	-180.30	14.980	-180.30	-14.980	.078	.375
.800	[illegible]	-182.00	16.960	-182.00	-16.950	.592	.400
.850	[illegible]	-183.30	19.080	-183.30	-19.048	1.098	.425
.900	[illegible]	-183.50	21.520	-183.50	-21.470	1.464	.450
.950	[illegible]	-184.60	23.720	-184.60	-23.644	1.902	.475
.974	[illegible]	-184.70	25.560	-184.70	-25.494	2.096	.487

DISTRIBUTIØN ØF CURRENT AND CHARGE ØN MØNØPØLE ANTENNA ØVER SALT WATER

ALFAL/BETAL = .0407 BETAL/BETAC = 1.047 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTIØN IN MA/VØLT

	RAW DATA		NØRMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	2.829	174.50	1.640	55.50	.832	1.413	.003
.050	1.552	145.60	.900	30.60	.775	.458	.025
.100	1.414	87.40	.820	-27.20	.729	-.375	.050
.150	2.345	55.30	1.360	-59.70	.686	-1.174	.075
.200	3.519	41.70	2.040	-73.30	.586	-1.954	.100
.250	4.796	34.90	2.780	-80.10	.478	-2.739	.125
.300	5.465	31.70	3.400	-83.30	.397	-3.377	.150
.350	6.659	29.20	3.860	-85.80	.283	-3.850	.175
.400	7.521	27.40	4.360	-87.60	.183	-4.356	.200
.450	[illegible]	25.60	4.720	-85.20	.066	-4.720	.225
.500	[illegible]	24.90	4.960	-90.10	-.009	-4.960	.250
.550	[illegible]	24.00	4.980	-91.00	-.087	-4.979	.275
.600	8.314	23.20	4.820	-91.80	-.151	-4.818	.300
.650	[illegible]	22.50	4.640	-92.50	-.202	-4.636	.325
.700	7.521	21.90	4.360	-93.10	-.236	-4.354	.350
.750	6.797	21.20	3.940	-93.80	-.261	-3.931	.375
.800	5.761	21.00	3.340	-94.00	-.233	-3.332	.400
.850	4.554	20.60	2.640	-94.40	-.203	-2.632	.425
.900	3.450	20.00	2.000	-95.00	-.174	-1.992	.450
.950	2.001	19.40	1.160	-95.60	-.113	-1.154	.475
.968	1.242	19.60	.720	-95.40	-.068	-.717	.484

B. MEASURED CHARGE DISTRIBUTIØN IN PICCØUL/VØLT-M

	RAW DATA		NØRMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.012	7.952	.00	22.400	.00	22.400	.000	.006
.050	6.461	-1.20	18.200	-1.20	18.196	-.381	.025
.100	5.964	-2.50	16.800	-2.50	16.784	-.733	.050
.150	5.765	-3.90	16.240	-3.90	16.202	-1.105	.075
.200	5.218	-5.10	14.700	-5.10	14.642	-1.307	.100
.250	4.672	-6.70	13.160	-6.70	13.070	-1.535	.125
.300	4.075	-8.20	11.480	-8.20	11.363	-1.637	.150
.350	3.330	-10.60	9.380	-10.60	9.220	-1.725	.175
.400	2.684	-13.80	7.560	-13.80	7.342	-1.803	.200
.450	1.761	-20.30	4.960	-20.30	4.652	-1.721	.225
.500	.838	-38.80	2.360	-38.80	1.839	-1.479	.250
.550	.554	-119.00	1.560	-119.00	-.756	-1.364	.275
.600	1.321	-161.20	3.720	-161.20	-3.522	-1.199	.300
.650	2.215	-171.20	6.240	-171.20	-6.167	-.955	.325
.700	3.131	-175.20	8.820	-175.20	-8.789	-.738	.350
.750	4.075	-177.80	11.480	-177.80	-11.472	-.441	.375
.800	4.572	-178.80	12.880	-178.80	-12.877	-.270	.400
.850	5.169	-179.80	14.560	-179.80	-14.560	-.051	.425
.900	5.964	-180.80	16.800	-180.80	-16.798	.235	.450
.950	6.859	-182.50	19.160	-182.50	-19.162	.837	.475
.974	7.505	-182.50	21.140	-182.50	-21.120	.922	.487

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THE BEVERAGE WAVE ANTENNA: CURRENTS, CHARGES AND ADMITTANCES VO--ETC(U)
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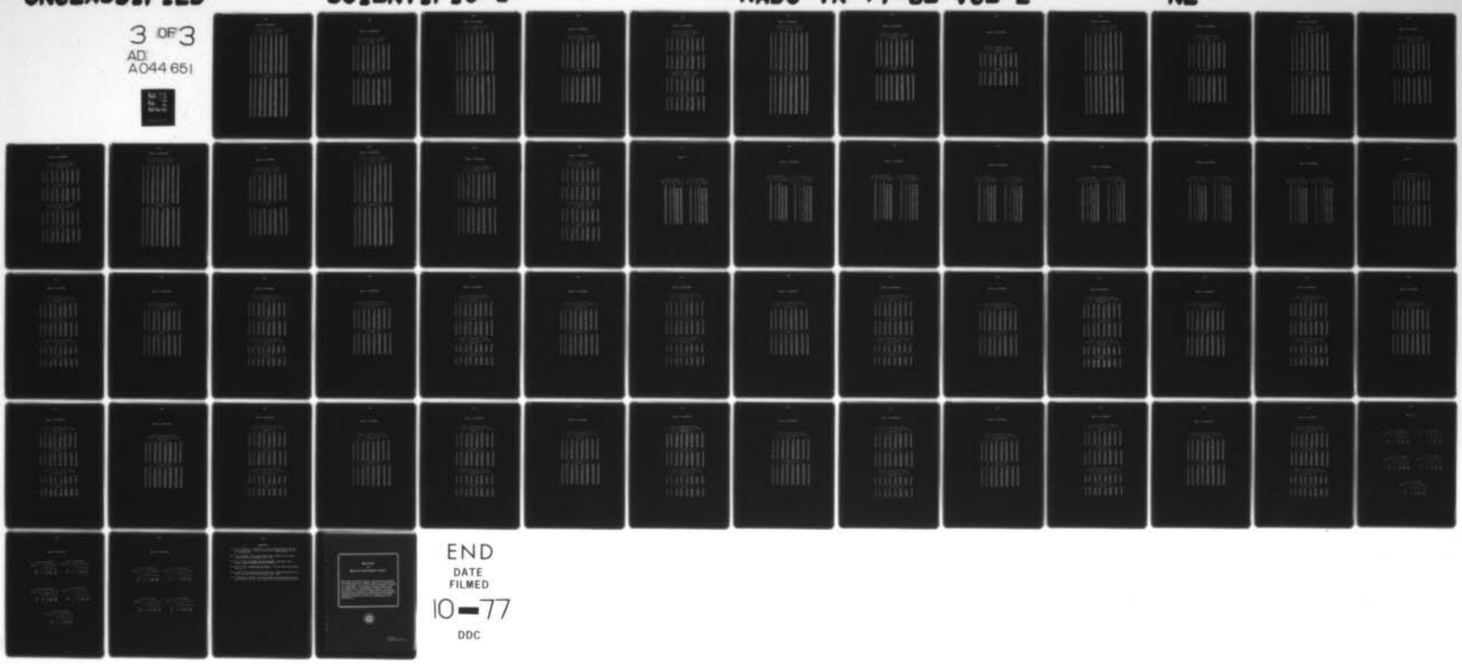

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TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0220   BETAL/BETAO = 1.025   H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	4.501	176.70	1.940	61.70	.920	1.708	.003
.017	2.923	159.60	1.260	44.60	.897	.885	.025
.033	1.995	123.70	.860	8.70	.850	.130	.050
.050	2.227	79.70	.960	-35.30	.783	-.555	.075
.067	3.304	55.10	1.420	-55.90	.712	-1.229	.100
.083	4.454	43.30	1.920	-71.70	.603	-1.823	.125
.100	5.614	36.90	2.420	-78.10	.499	-2.368	.150
.117	6.724	32.50	2.900	-82.50	.379	-2.875	.175
.133	7.563	29.50	3.260	-85.50	.256	-3.250	.200
.150	8.398	27.10	3.620	-87.50	.133	-3.618	.225
.167	8.862	25.20	3.820	-85.80	.013	-3.820	.250
.183	9.187	23.30	3.960	-91.70	-.117	-3.958	.275
.200	9.187	21.70	3.960	-93.30	-.228	-3.953	.300
.217	9.002	20.20	3.880	-94.80	-.325	-3.866	.325
.233	8.779	18.50	3.780	-96.10	-.402	-3.759	.350
.250	8.027	17.00	3.460	-98.00	-.482	-3.426	.375
.267	7.379	14.80	3.180	-100.20	-.563	-3.130	.400
.283	6.403	12.40	2.760	-102.60	-.602	-2.694	.425
.300	5.197	9.20	2.240	-105.80	-.610	-2.155	.450
.317	3.944	3.60	1.700	-111.40	-.620	-1.583	.475
.333	2.738	-7.00	1.180	-122.00	-.625	-1.001	.500
.350	1.531	-34.00	.660	-149.00	-.566	-.340	.525
.367	1.392	-94.90	.600	-205.90	-.520	.299	.550
.383	2.413	-128.60	1.040	-243.60	-.462	.932	.575
.400	3.619	-140.60	1.560	-255.60	-.388	1.511	.600
.417	4.872	-146.50	2.100	-261.50	-.310	2.077	.625
.433	6.032	-150.20	2.600	-265.20	-.218	2.591	.650
.450	7.006	-152.50	3.020	-267.50	-.132	3.017	.675
.467	7.795	-154.10	3.360	-269.10	-.053	3.360	.700
.483	8.538	-155.50	3.680	-270.50	.032	3.680	.725
.500	9.002	-156.80	3.880	-271.80	.122	3.878	.750
.517	9.234	-157.90	3.980	-272.90	.201	3.975	.775
.533	9.187	-158.90	3.960	-273.90	.269	3.951	.800
.550	9.002	-159.80	3.880	-274.80	.325	3.866	.825
.567	8.533	-160.80	3.680	-275.80	.372	3.661	.850
.583	7.702	-161.80	3.320	-276.80	.393	3.297	.875
.600	6.774	-163.10	2.920	-278.10	.411	2.891	.900
.617	5.614	-164.50	2.420	-279.50	.399	2.387	.925
.633	4.408	-167.00	1.900	-282.00	.395	1.858	.950
.650	3.109	-170.60	1.340	-285.60	.360	1.291	.975
.667	1.717	-180.50	.740	-295.50	.319	.668	1.000
.683	.696	-231.50	.300	-346.50	.292	.070	1.025
.700	1.485	-311.50	.640	-426.50	.255	-.587	1.050
.717	2.877	-326.40	1.240	-441.40	.185	-1.226	1.075
.733	4.269	-331.30	1.840	-446.30	.119	-1.836	1.100
.750	5.522	-333.70	2.380	-448.70	.054	-2.379	1.125
.767	6.589	-335.40	2.840	-450.40	-.020	-2.840	1.150
.783	7.610	-336.30	3.280	-451.30	-.074	-3.279	1.175
.800	8.306	-337.20	3.580	-452.20	-.137	-3.577	1.200
.817	8.909	-337.70	3.840	-452.70	-.181	-3.836	1.225
.833	9.187	-338.00	3.960	-453.00	-.207	-3.955	1.250
.850	9.187	-338.40	3.960	-453.40	-.235	-3.953	1.275
.867	8.909	-338.80	3.840	-453.80	-.254	-3.832	1.300
.883	8.630	-339.20	3.720	-454.20	-.272	-3.710	1.325
.900	8.074	-339.60	3.480	-454.60	-.279	-3.469	1.350
.917	7.331	-339.80	3.160	-454.80	-.264	-3.149	1.375
.933	6.171	-339.90	2.660	-454.90	-.227	-2.650	1.400
.950	4.872	-339.90	2.100	-454.90	-.179	-2.092	1.425
.967	3.712	-340.40	1.600	-455.40	-.151	-1.593	1.450
.983	2.134	-340.60	.920	-455.60	-.090	-.916	1.475
.989	1.346	-340.60	.580	-455.60	-.057	-.577	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	9.997	-5.00	21.500	-5.00	21.418	-1.874	.006
.017	7.617	-6.20	16.380	-6.20	16.284	-1.769	.025
.033	6.845	-7.90	14.720	-7.90	14.580	-2.023	.050
.050	6.445	-9.90	13.860	-9.90	13.654	-2.383	.075
.067	6.082	-11.70	13.080	-11.70	12.808	-2.652	.100
.083	5.496	-13.70	11.820	-13.70	11.484	-2.799	.125
.100	[illegible]	-16.00	10.500	-16.00	10.093	-2.894	.150
.117	4.148	-19.40	8.920	-19.40	8.415	-2.963	.175
.133	3.404	-23.40	7.320	-23.40	6.718	-2.907	.200
.150	2.641	-30.60	5.680	-30.60	4.889	-2.891	.225
.167	1.786	-42.50	3.840	-42.50	2.831	-2.594	.250
.183	1.125	-74.00	2.420	-74.00	.667	-2.326	.275
.200	1.162	-124.60	2.500	-124.60	-1.420	-2.058	.300
.217	1.804	-154.30	3.880	-154.30	-3.496	-1.683	.325
.233	2.660	-166.60	5.720	-166.60	-5.564	-1.326	.350
.250	3.553	-173.10	7.640	-173.10	-7.585	-.918	.375
.267	4.352	-177.10	9.360	-177.10	-9.348	-.474	.400
.283	4.948	-179.90	10.640	-179.90	-10.640	-.019	.425
.300	5.496	-182.20	11.820	-182.20	-11.811	.454	.450
.317	5.896	-183.80	12.680	-183.80	-12.652	.840	.475
.333	6.101	-185.20	13.120	-185.20	-13.066	1.189	.500
.350	6.175	-186.60	13.280	-186.60	-13.192	1.526	.525
.367	6.147	-187.70	13.220	-187.70	-13.101	1.771	.550
.383	5.915	-189.10	12.720	-189.10	-12.560	2.012	.575
.400	5.599	-190.30	12.040	-190.30	-11.846	2.153	.600
.417	5.050	-191.80	10.860	-191.80	-10.630	2.221	.625
.433	4.445	-193.60	9.560	-193.60	-9.292	2.248	.650
.450	3.850	-195.70	8.280	-195.70	-7.971	2.241	.675
.467	3.004	-198.80	6.460	-198.80	-6.115	2.082	.700
.483	2.120	-209.70	4.560	-209.70	-4.143	1.908	.725
.500	1.224	-219.00	2.640	-219.00	-2.052	1.661	.750
.517	.660	-274.30	1.420	-274.30	.106	1.416	.775
.533	1.144	-334.50	2.460	-334.50	2.220	1.059	.800
.550	2.083	-351.00	4.480	-351.00	4.425	.701	.825
.567	3.004	-357.00	6.460	-357.00	6.451	.338	.850
.583	3.804	-360.30	8.180	-360.30	8.180	-.043	.875
.600	4.548	-362.50	9.780	-362.50	9.771	-.427	.900
.617	5.094	-363.70	10.960	-363.70	10.937	-.707	.925
.633	5.599	-364.80	12.040	-364.80	11.998	-1.007	.950
.650	5.850	-365.40	12.580	-365.40	12.524	-1.184	.975
.667	6.045	-366.30	13.000	-366.30	12.921	-1.427	1.000
.683	6.157	-367.00	13.240	-367.00	13.141	-1.611	1.025
.700	6.045	-367.50	13.000	-367.50	12.889	-1.697	1.050
.717	5.701	-368.40	12.260	-368.40	12.128	-1.791	1.075
.733	5.199	-368.80	11.180	-368.80	11.048	-1.710	1.100
.750	4.799	-370.10	10.320	-370.10	10.160	-1.810	1.125
.767	4.101	-370.90	8.820	-370.90	8.661	-1.668	1.150
.783	3.348	-372.00	7.200	-372.00	7.043	-1.497	1.175
.800	2.557	-374.00	5.500	-374.00	5.337	-1.331	1.200
.817	1.600	-377.00	3.440	-377.00	3.290	-1.006	1.225
.833	.549	-392.00	1.180	-392.00	1.001	-.625	1.250
.850	.521	-521.50	1.120	-521.50	-1.068	-.385	1.275
.867	1.527	-539.40	3.240	-539.40	-3.240	-.034	1.300
.883	2.502	-543.50	5.380	-543.50	-5.370	.328	1.325
.900	3.450	-545.00	7.420	-545.00	-7.392	.647	1.350
.917	4.417	-546.10	9.500	-546.10	-9.446	1.010	1.375
.933	5.050	-546.70	10.860	-546.70	-10.786	1.267	1.400
.950	5.701	-547.20	12.260	-547.20	-12.163	1.537	1.425
.967	6.603	-547.40	14.200	-547.40	-14.082	1.829	1.450
.983	7.421	-548.10	15.960	-548.10	-15.801	2.249	1.475
.991	8.500	-548.10	18.280	-548.10	-18.098	2.576	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0220 BETAL/BETAO = 1.025 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	3.847	179.70	1.620	64.70	.692	1.465	.003
.025	2.185	161.50	.920	46.50	.633	.667	.025
.050	1.425	107.70	.600	-7.30	.595	-.076	.050
.075	2.137	62.10	.900	-52.90	.543	-.718	.075
.100	3.420	44.20	1.440	-70.80	.474	-1.360	.100
.125	4.702	37.10	1.980	-77.90	.415	-1.936	.125
.150	5.890	32.70	2.480	-82.30	.332	-2.458	.150
.175	6.983	29.90	2.940	-85.10	.251	-2.929	.175
.200	7.793	28.00	3.260	-87.00	.172	-3.276	.200
.225	8.598	26.50	3.620	-88.50	.095	-3.619	.225
.250	9.072	25.00	3.820	-90.00	.000	-3.820	.250
.275	9.262	23.90	3.900	-91.10	-.075	-3.899	.275
.300	9.310	22.60	3.920	-92.20	-.150	-3.917	.300
.325	9.025	21.70	3.800	-93.30	-.219	-3.794	.325
.350	8.692	20.80	3.660	-94.20	-.268	-3.650	.350
.375	7.837	19.70	3.300	-95.30	-.305	-3.286	.375
.400	6.983	18.50	2.940	-96.50	-.333	-2.921	.400
.425	5.795	16.90	2.440	-98.10	-.344	-2.416	.425
.450	4.607	14.70	1.940	-100.30	-.347	-1.909	.450
.475	3.182	10.60	1.340	-104.40	-.333	-1.298	.475
.500	1.805	1.10	.760	-113.90	-.308	-.695	.500
.525	.712	-53.30	.300	-168.30	-.294	-.061	.525
.550	1.472	-128.50	.620	-243.50	-.277	.555	.550
.575	2.755	-144.30	1.160	-259.30	-.215	1.140	.575
.600	4.085	-149.50	1.720	-264.50	-.165	1.712	.600
.625	5.510	-152.00	2.320	-267.00	-.121	2.317	.625
.650	6.460	-153.60	2.720	-268.60	-.066	2.719	.650
.675	7.553	-154.50	3.180	-265.50	-.028	3.180	.675
.700	8.265	-155.30	3.480	-270.30	.018	3.480	.700
.725	8.978	-155.80	3.780	-270.80	.053	3.780	.725
.750	9.262	-156.50	3.900	-271.50	.102	3.899	.750
.775	9.168	-156.90	3.860	-271.90	.128	3.858	.775
.800	8.882	-157.00	3.740	-272.00	.131	3.738	.800
.825	8.645	-157.50	3.640	-272.50	.159	3.637	.825
.850	7.980	-157.90	3.360	-272.90	.170	3.356	.850
.875	7.267	-158.20	3.060	-273.20	.171	3.055	.875
.900	6.080	-158.20	2.560	-273.20	.143	2.556	.900
.925	4.798	-158.20	2.020	-273.20	.113	2.017	.925
.950	3.610	-158.20	1.520	-273.20	.085	1.518	.950
.975	2.137	-158.20	.900	-273.20	.050	.899	.975
.984	1.330	-158.20	.560	-273.20	.031	.559	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	9.375	-5.00	21.000	-5.00	20.920	-1.830	.006
.025	7.533	-5.80	15.860	-5.80	15.779	-1.603	.025
.050	6.783	-6.90	14.280	-6.90	14.177	-1.716	.050
.075	6.289	-8.20	13.240	-8.20	13.105	-1.888	.075
.100	5.833	-9.40	12.280	-9.40	12.115	-2.006	.100
.125	5.291	-11.20	11.140	-11.20	10.928	-2.164	.125
.150	4.636	-12.90	9.760	-12.90	9.514	-2.179	.150
.175	3.895	-15.10	8.200	-15.10	7.917	-2.136	.175
.200	3.197	-18.50	6.520	-18.50	6.183	-2.069	.200
.225	2.233	-24.40	4.700	-24.40	4.280	-1.942	.225
.250	1.330	-38.30	2.800	-38.30	2.197	-1.735	.250
.275	.722	-86.00	1.520	-86.00	.106	-1.516	.275
.300	1.140	-149.20	2.400	-149.20	-2.062	-1.229	.300
.325	2.042	-168.10	4.300	-168.10	-4.208	-.887	.325
.350	2.992	-174.70	6.300	-174.70	-6.273	-.582	.350
.375	3.895	-178.50	8.200	-178.50	-8.197	-.215	.375
.400	4.588	-180.50	9.660	-180.50	-9.660	.084	.400
.425	5.187	-182.20	10.920	-182.20	-10.912	.419	.425
.450	5.662	-183.40	11.920	-183.40	-11.899	.707	.450
.475	5.937	-184.40	12.500	-184.40	-12.463	.959	.475
.500	6.137	-185.20	12.920	-185.20	-12.867	1.171	.500
.525	6.289	-185.80	13.240	-185.80	-13.172	1.338	.525
.550	6.137	-186.40	12.920	-186.40	-12.839	1.440	.550
.575	5.861	-187.20	12.340	-187.20	-12.243	1.547	.575
.600	5.462	-187.60	11.500	-187.60	-11.399	1.521	.600
.625	4.835	-188.30	10.180	-188.30	-10.073	1.470	.625
.650	4.189	-189.00	8.820	-189.00	-8.711	1.380	.650
.675	3.391	-190.20	7.140	-190.20	-7.027	1.264	.675
.700	2.622	-192.30	5.520	-192.30	-5.393	1.176	.700
.725	1.624	-195.70	3.420	-195.70	-3.292	.925	.725
.750	.589	-211.50	1.240	-211.50	-1.057	.648	.750
.775	.484	-337.50	1.020	-337.50	.942	.390	.775
.800	1.444	-357.50	3.040	-357.50	3.037	.133	.800
.825	2.413	-361.70	5.080	-361.70	5.078	-.151	.825
.850	3.344	-363.50	7.040	-363.50	7.027	-.430	.850
.875	4.341	-364.50	9.140	-364.50	9.112	-.717	.875
.900	4.892	-365.20	10.300	-365.20	10.258	-.933	.900
.925	5.538	-365.70	11.660	-365.70	11.602	-1.158	.925
.950	6.384	-366.00	13.440	-366.00	13.366	-1.405	.950
.975	7.258	-366.20	15.280	-366.20	15.191	-1.650	.975
.987	8.227	-366.40	17.320	-366.40	17.212	-1.931	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALPHAL/BETAL = .0190 BETAL/BETAC = 1.023 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ RE = 2.885 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	[illegible]	[illegible]	1.840	61.80	.869	1.622	.003
.017	[illegible]	166.20	1.100	46.20	.761	.794	.025
.033	[illegible]	130.00	.660	10.00	.670	.118	.050
.050	[illegible]	77.80	.760	-42.80	.558	-.516	.075
.067	[illegible]	52.60	1.180	-67.40	.453	-1.089	.100
.083	[illegible]	41.60	1.660	-78.40	.334	-1.626	.125
.100	[illegible]	36.50	2.060	-83.50	.235	-2.067	.150
.117	[illegible]	33.00	2.560	-87.00	.134	-2.556	.175
.133	[illegible]	30.50	2.820	-89.50	.025	-2.820	.200
.150	[illegible]	28.40	3.120	-91.60	-.087	-3.119	.225
.167	[illegible]	27.10	3.240	-92.90	-.166	-3.276	.250
.183	[illegible]	25.60	3.360	-94.40	-.258	-3.350	.275
.200	[illegible]	24.30	3.340	-95.70	-.332	-3.323	.300
.217	[illegible]	23.20	3.260	-96.80	-.388	-3.257	.325
.233	9.527	21.60	3.160	-98.20	-.451	-3.128	.350
.250	[illegible]	20.40	2.900	-95.60	-.484	-2.859	.375
.267	[illegible]	19.00	2.720	-101.00	-.519	-2.670	.400
.283	[illegible]	17.20	2.280	-102.80	-.505	-2.223	.425
.300	[illegible]	14.40	1.860	-105.40	-.500	-1.791	.450
.317	[illegible]	10.20	1.360	-109.80	-.461	-1.280	.475
.333	2.713	1.00	.900	-119.00	-.436	-.787	.500
.350	1.265	-28.00	.420	-148.00	-.356	-.223	.525
.367	1.266	-106.00	.420	-226.00	-.292	.302	.550
.383	2.593	-134.80	.860	-254.80	-.225	.830	.575
.400	[illegible]	-143.60	1.320	-263.60	-.147	1.312	.600
.417	5.427	-148.00	1.800	-268.00	-.063	1.799	.625
.433	6.593	-150.30	2.220	-270.30	.012	2.220	.650
.450	7.779	-152.00	2.580	-272.00	.090	2.578	.675
.467	8.663	-153.40	2.880	-273.40	.171	2.875	.700
.483	9.467	-154.50	3.140	-274.50	.246	3.130	.725
.500	[illegible]	-155.40	3.300	-275.40	.311	3.285	.750
.517	[illegible]	-156.00	3.340	-276.00	.349	3.322	.775
.533	[illegible]	-157.00	3.340	-277.00	.407	3.315	.800
.550	9.589	-157.90	3.280	-277.90	.451	3.249	.825
.567	9.407	-158.70	3.120	-278.70	.472	3.084	.850
.583	8.502	-159.60	2.820	-275.60	.470	2.781	.875
.600	7.537	-160.40	2.500	-280.40	.451	2.459	.900
.617	6.332	-162.00	2.100	-282.00	.437	2.054	.925
.633	4.945	-164.00	1.640	-284.00	.397	1.591	.950
.650	3.377	-168.00	1.120	-288.00	.346	1.065	.975
.667	1.930	-176.60	.640	-296.80	.289	.571	1.000
.683	.724	-226.30	.240	-346.30	.233	.057	1.025
.700	1.507	-306.60	.500	-426.60	.199	-.459	1.050
.717	3.015	-323.20	1.000	-443.20	.118	-.993	1.075
.733	4.462	-328.30	1.480	-448.30	.044	-1.479	1.100
.750	5.970	-331.00	1.980	-451.00	-.038	-1.980	1.125
.767	7.236	-332.50	2.400	-452.50	-.105	-2.398	1.150
.783	8.321	-333.40	2.760	-453.40	-.164	-2.755	1.175
.800	9.105	-334.20	3.020	-454.20	-.221	-3.012	1.200
.817	9.769	-335.10	3.240	-455.10	-.288	-3.227	1.225
.833	10.130	-335.50	3.360	-455.50	-.322	-3.345	1.250
.850	[illegible]	-335.70	3.340	-455.70	-.332	-3.323	1.275
.867	9.949	-336.10	3.300	-456.10	-.351	-3.281	1.300
.883	9.708	-336.20	3.220	-456.20	-.348	-3.201	1.325
.900	8.985	-336.70	2.980	-456.70	-.348	-2.960	1.350
.917	8.141	-337.20	2.700	-457.20	-.338	-2.679	1.375
.933	6.934	-337.20	2.300	-457.20	-.288	-2.282	1.400
.950	5.668	-337.20	1.880	-457.20	-.236	-1.865	1.425
.967	4.161	-337.20	1.380	-457.20	-.173	-1.369	1.450
.983	2.593	-337.20	.860	-457.20	-.108	-.853	1.475
.989	1.568	-337.20	.520	-457.20	-.065	-.516	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	12.540	-5.00	21.620	-5.00	21.538	-1.884	.006
.017	9.384	-5.80	16.180	-5.80	16.097	-1.635	.025
.033	8.224	-6.90	14.180	-6.90	14.077	-1.704	.050
.050	7.528	-8.10	12.980	-8.10	12.851	-1.829	.075
.067	6.972	-9.40	12.020	-9.40	11.859	-1.963	.100
.083	6.171	-11.40	10.640	-11.40	10.430	-2.103	.125
.100	5.417	-13.20	9.340	-13.20	9.093	-2.133	.150
.117	4.470	-15.70	7.880	-15.70	7.586	-2.132	.175
.133	3.604	-19.10	6.220	-19.10	5.878	-2.035	.200
.150	2.714	-25.70	4.680	-25.70	4.217	-2.030	.225
.167	1.740	-38.40	3.000	-38.40	2.351	-1.863	.250
.183	.986	-76.40	1.700	-76.40	.400	-1.652	.275
.200	1.195	-134.30	2.060	-134.30	-1.439	-1.474	.300
.217	2.030	-159.20	3.500	-159.20	-3.272	-1.243	.325
.233	3.016	-168.90	5.200	-168.90	-5.103	-1.001	.350
.250	4.014	-174.10	6.920	-174.10	-6.883	-.711	.375
.267	4.918	-177.00	8.480	-177.00	-8.469	-.444	.400
.283	5.568	-179.00	9.600	-179.00	-9.599	-.168	.425
.300	6.125	-180.60	10.560	-180.60	-10.559	.111	.450
.317	6.577	-182.20	11.340	-182.20	-11.332	.435	.475
.333	6.673	-183.30	11.500	-183.30	-11.481	.662	.500
.350	6.774	-184.30	11.680	-184.30	-11.647	.876	.525
.367	6.728	-185.20	11.600	-185.20	-11.552	1.051	.550
.383	6.434	-186.20	11.100	-186.20	-11.035	1.199	.575
.400	6.125	-187.20	10.560	-187.20	-10.477	1.324	.600
.417	5.568	-188.40	9.600	-188.40	-9.497	1.402	.625
.433	4.872	-189.70	8.400	-189.70	-8.280	1.415	.650
.450	4.118	-191.80	7.100	-191.80	-6.950	1.452	.675
.467	3.260	-194.30	5.620	-194.30	-5.446	1.388	.700
.483	2.227	-200.00	3.840	-200.00	-3.608	1.313	.725
.500	1.230	-213.50	2.120	-213.50	-1.768	1.170	.750
.517	.580	-273.00	1.000	-273.00	.052	.999	.775
.533	1.195	-337.20	2.060	-337.20	1.899	.798	.800
.550	2.250	-351.00	3.880	-351.00	3.832	.607	.825
.567	3.155	-356.00	5.440	-356.00	5.427	.379	.850
.583	4.113	-358.80	7.100	-358.80	7.098	.149	.875
.600	4.918	-360.60	8.480	-360.60	8.480	-.089	.900
.617	5.568	-361.90	9.600	-361.90	9.595	-.318	.925
.633	6.020	-362.80	10.380	-362.80	10.368	-.507	.950
.650	6.322	-363.60	10.900	-363.60	10.878	-.684	.975
.667	6.577	-364.30	11.340	-364.30	11.308	-.850	1.000
.683	6.743	-364.90	11.620	-364.90	11.578	-.993	1.025
.700	6.624	-365.50	11.420	-365.50	11.367	-1.095	1.050
.717	6.322	-366.00	10.900	-366.00	10.840	-1.139	1.075
.733	5.916	-366.10	10.200	-366.10	10.142	-1.084	1.100
.750	5.220	-367.40	9.000	-367.40	8.925	-1.159	1.125
.767	4.536	-368.10	7.820	-368.10	7.742	-1.102	1.150
.783	3.758	-369.00	6.480	-369.00	6.400	-1.014	1.175
.800	2.946	-371.00	5.080	-371.00	4.987	-.969	1.200
.817	1.879	-373.80	3.240	-373.80	3.146	-.773	1.225
.833	.754	-385.00	1.300	-385.00	1.178	-.549	1.250
.850	.429	-508.00	.740	-508.00	-.688	-.392	1.275
.867	1.508	-535.90	2.600	-535.90	-2.593	-.186	1.300
.883	2.459	-540.20	4.240	-540.20	-4.240	.015	1.325
.900	3.666	-542.70	6.320	-542.70	-6.313	.298	1.350
.917	4.768	-543.70	8.220	-543.70	-8.203	.530	1.375
.933	5.464	-544.50	9.420	-544.50	-9.391	.739	1.400
.950	6.276	-545.10	10.820	-545.10	-10.777	.962	1.425
.967	7.320	-545.50	12.620	-545.50	-12.562	1.210	1.450
.983	8.433	-545.90	14.540	-545.90	-14.463	1.495	1.475
.991	9.628	-546.00	16.600	-546.00	-16.509	1.735	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0190 BETAL/BETAC = 1.023 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	4.252	195.00	1.660	68.00	.622	1.539	.003
.025	2.456	180.00	.940	53.00	.566	.751	.025
.050	1.331	133.00	.520	6.00	.517	.054	.050
.075	1.843	77.00	.720	-50.00	.463	-.552	.075
.100	3.072	57.10	1.200	-65.90	.412	-1.127	.100
.125	4.352	49.00	1.700	-78.00	.353	-1.663	.125
.150	5.474	44.90	2.140	-82.10	.294	-2.120	.150
.175	6.502	42.10	2.540	-84.50	.226	-2.530	.175
.200	7.219	40.10	2.820	-86.90	.153	-2.816	.200
.225	7.987	38.70	3.120	-88.30	.093	-3.119	.225
.250	8.346	37.60	3.260	-89.40	.034	-3.260	.250
.275	8.602	36.60	3.360	-90.40	-.023	-3.360	.275
.300	8.602	35.40	3.360	-91.60	-.094	-3.359	.300
.325	8.448	34.60	3.300	-92.40	-.138	-3.297	.325
.350	8.038	33.60	3.140	-93.40	-.186	-3.134	.350
.375	7.270	32.70	2.840	-94.30	-.213	-2.832	.375
.400	6.502	31.70	2.540	-95.30	-.235	-2.529	.400
.425	5.376	30.20	2.100	-96.80	-.249	-2.085	.425
.450	4.301	28.20	1.680	-98.80	-.257	-1.660	.450
.475	2.970	24.40	1.160	-102.60	-.253	-1.132	.475
.500	1.741	16.70	.680	-110.30	-.236	-.638	.500
.525	.666	-30.20	.260	-157.20	-.240	-.101	.525
.550	1.229	-117.70	.480	-244.70	-.205	.434	.550
.575	2.458	-132.10	.960	-259.10	-.182	.943	.575
.600	3.686	-137.30	1.440	-264.30	-.143	1.433	.600
.625	5.018	-139.80	1.960	-266.80	-.109	1.957	.625
.650	6.042	-141.20	2.360	-268.20	-.074	2.359	.650
.675	6.707	-142.00	2.620	-269.00	-.046	2.620	.675
.700	7.629	-142.80	2.980	-269.80	-.010	2.980	.700
.725	8.192	-143.50	3.200	-270.50	.028	3.200	.725
.750	8.602	-143.80	3.360	-270.80	.047	3.360	.750
.775	8.550	-144.10	3.340	-271.10	.064	3.339	.775
.800	8.294	-144.60	3.240	-271.60	.090	3.239	.800
.825	8.141	-144.70	3.180	-271.70	.094	3.179	.825
.850	7.578	-145.30	2.960	-272.30	.119	2.958	.850
.875	6.861	-145.60	2.680	-272.60	.122	2.677	.875
.900	5.786	-145.50	2.260	-272.50	.099	2.258	.900
.925	4.710	-145.50	1.840	-272.50	.080	1.838	.925
.950	3.533	-145.50	1.380	-272.50	.060	1.379	.950
.975	2.150	-145.50	.840	-272.50	.037	.839	.975
.984	1.331	-145.50	.520	-272.50	.023	.520	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	10.043	-3.00	20.300	-3.00	20.272	-1.062	.006
.025	7.534	-3.50	15.220	-3.50	15.192	-.929	.025
.050	6.682	-4.30	13.500	-4.30	13.462	-1.012	.050
.075	6.079	-5.30	12.280	-5.30	12.227	-1.134	.075
.100	5.574	-6.30	11.260	-6.30	11.192	-1.236	.100
.125	4.920	-7.60	9.940	-7.60	9.853	-1.315	.125
.150	4.316	-9.20	8.720	-9.20	8.608	-1.394	.150
.175	3.613	-11.30	7.300	-11.30	7.158	-1.430	.175
.200	2.861	-14.20	5.780	-14.20	5.603	-1.418	.200
.225	1.960	-19.80	3.960	-19.80	3.726	-1.341	.225
.250	1.178	-32.80	2.380	-32.80	2.001	-1.289	.250
.275	.604	-80.60	1.220	-80.80	.195	-1.204	.275
.300	.980	-145.80	1.980	-145.80	-1.638	-1.113	.300
.325	1.832	-164.30	3.700	-164.30	-3.562	-1.001	.325
.350	2.673	-171.20	5.400	-171.20	-5.336	-.826	.350
.375	3.425	-174.70	6.920	-174.70	-6.890	-.639	.375
.400	4.099	-176.80	8.280	-176.80	-8.267	-.462	.400
.425	4.623	-178.20	9.340	-178.20	-9.335	-.293	.425
.450	5.029	-179.60	10.160	-179.60	-10.160	-.071	.450
.475	5.277	-180.50	10.660	-180.50	-10.660	.093	.475
.500	5.475	-181.30	11.060	-181.30	-11.057	.251	.500
.525	5.623	-181.70	11.360	-181.70	-11.355	.337	.525
.550	5.524	-182.50	11.160	-182.50	-11.149	.487	.550
.575	5.405	-183.30	10.920	-183.30	-10.902	.629	.575
.600	4.920	-183.70	9.940	-183.70	-9.919	.641	.600
.625	4.425	-184.20	8.940	-184.20	-8.916	.655	.625
.650	3.821	-184.90	7.720	-184.90	-7.692	.659	.650
.675	3.168	-186.10	6.400	-186.10	-6.364	.680	.675
.700	2.465	-187.70	4.980	-187.70	-4.935	.667	.700
.725	1.604	-190.80	3.240	-190.80	-3.183	.607	.725
.750	.634	-202.40	1.280	-202.40	-1.183	.488	.750
.775	.356	-323.70	.720	-323.70	.580	.426	.775
.800	1.188	-352.70	2.400	-352.70	2.381	.305	.800
.825	2.059	-357.70	4.160	-357.70	4.157	.167	.825
.850	2.960	-359.60	5.980	-359.60	5.980	.042	.850
.875	3.821	-360.90	7.720	-360.90	7.719	-.121	.875
.900	4.376	-361.50	8.840	-361.50	8.837	-.231	.900
.925	5.029	-362.10	10.160	-362.10	10.153	-.372	.925
.950	5.930	-362.60	11.980	-362.60	11.968	-.543	.950
.975	6.831	-363.00	13.800	-363.00	13.781	-.722	.975
.987	7.791	-363.20	15.740	-363.20	15.718	-.879	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0220 BETAL/BETAC = 1.025 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA			NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	2.980	184.70	1.260	69.70	.437	1.182	.003
.050	1.135	157.20	.480	42.20	.351	.322	.025
.100	1.230	69.70	.520	-45.30	.361	-.370	.050
.150	2.554	42.50	1.080	-72.50	.325	-1.030	.075
.200	4.020	34.50	1.700	-80.50	.281	-1.677	.100
.250	5.298	30.90	2.240	-84.10	.230	-2.228	.125
.300	6.433	29.20	2.720	-85.80	.199	-2.713	.150
.350	7.284	27.80	3.080	-87.20	.150	-3.076	.175
.400	8.230	26.90	3.480	-88.10	.115	-3.478	.200
.450	8.798	25.80	3.720	-89.20	.052	-3.720	.225
.500	9.271	25.40	3.920	-89.60	.027	-3.920	.250
.550	9.176	24.80	3.880	-90.20	-.014	-3.880	.275
.600	8.940	24.70	3.780	-90.30	-.020	-3.780	.300
.650	8.609	24.20	3.640	-90.80	-.051	-3.640	.325
.700	8.467	23.80	3.580	-91.20	-.075	-3.579	.350
.750	7.332	23.40	3.100	-91.60	-.087	-3.099	.375
.800	6.149	23.40	2.600	-91.60	-.073	-2.599	.400
.850	4.872	23.40	2.060	-91.60	-.058	-2.059	.425
.900	3.689	23.40	1.560	-91.60	-.044	-1.559	.450
.950	2.128	23.40	.900	-91.60	-.025	-.900	.475
.968	1.372	23.40	.580	-91.60	-.016	-.580	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA			NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	9.975	-2.00	21.000	-2.00	20.987	-.733	.006
.050	7.533	-2.30	15.860	-2.30	15.847	-.636	.025
.100	6.688	-2.80	14.080	-2.80	14.063	-.688	.050
.150	6.184	-3.50	13.020	-3.50	12.996	-.795	.075
.200	5.491	-4.20	11.560	-4.20	11.529	-.847	.100
.250	4.864	-4.80	10.240	-4.80	10.204	-.857	.125
.300	4.142	-5.50	8.720	-5.50	8.680	-.836	.150
.350	3.315	-7.20	6.980	-7.20	6.925	-.875	.175
.400	2.641	-8.80	5.560	-8.80	5.495	-.851	.200
.450	1.653	-12.50	3.480	-12.50	3.398	-.753	.225
.500	.608	-28.50	1.280	-28.50	1.125	-.611	.250
.550	.513	-140.30	1.080	-140.30	-.831	-.690	.275
.600	1.444	-172.30	3.040	-172.30	-3.013	-.407	.300
.650	2.403	-176.90	5.060	-176.90	-5.053	-.274	.325
.700	3.391	-179.00	7.140	-179.00	-7.139	-.125	.350
.750	4.389	-180.10	9.240	-180.10	-9.240	.016	.375
.800	4.940	-180.70	10.400	-180.70	-10.399	.127	.400
.850	5.586	-181.40	11.760	-181.40	-11.756	.287	.425
.900	6.488	-181.70	13.660	-181.70	-13.654	.405	.450
.950	7.334	-182.00	15.440	-182.00	-15.431	.539	.475
.974	8.284	-182.10	17.440	-182.10	-17.428	.639	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0190 BETAL/BETAC = 1.023 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA			NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	3.600	195.80	1.440	68.80	.521	1.343	.003
.050	1.700	174.90	.680	47.90	.456	.505	.025
.100	1.100	115.30	.440	-11.70	.431	-.089	.050
.150	2.100	65.20	.840	-61.80	.397	-.740	.075
.200	3.250	52.10	1.300	-74.90	.339	-1.255	.100
.250	4.500	46.50	1.800	-80.50	.297	-1.775	.125
.300	5.600	43.30	2.240	-83.70	.246	-2.226	.150
.350	6.350	41.50	2.540	-85.50	.199	-2.532	.175
.400	7.250	40.20	2.900	-86.80	.162	-2.895	.200
.450	7.850	39.00	3.140	-88.00	.110	-3.138	.225
.500	8.200	38.50	3.280	-88.50	.086	-3.279	.250
.550	8.250	37.90	3.300	-89.10	.052	-3.300	.275
.600	8.000	37.60	3.200	-89.40	.034	-3.200	.300
.650	7.700	37.10	3.080	-89.90	.005	-3.080	.325
.700	7.300	36.90	2.920	-90.10	-.005	-2.920	.350
.750	6.600	36.20	2.640	-90.80	-.037	-2.640	.375
.800	5.600	36.20	2.240	-90.80	-.031	-2.240	.400
.850	4.500	35.90	1.800	-91.10	-.035	-1.800	.425
.900	3.450	36.00	1.380	-91.00	-.024	-1.380	.450
.950	2.050	36.00	.820	-91.00	-.014	-.820	.475
.968	1.300	36.00	.520	-91.00	-.009	-.520	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA			NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	10.048	-2.00	20.300	-2.00	20.288	-.708	.006
.050	7.336	-2.20	14.820	-2.20	14.809	-.569	.025
.100	6.435	-2.80	13.000	-2.80	12.984	-.635	.050
.150	5.782	-3.30	11.680	-3.30	11.661	-.672	.075
.200	5.227	-4.00	10.560	-4.00	10.534	-.737	.100
.250	4.524	-4.70	9.140	-4.70	9.109	-.749	.125
.300	3.871	-5.70	7.820	-5.70	7.781	-.777	.150
.350	3.119	-7.50	6.300	-7.50	6.246	-.822	.175
.400	2.485	-9.70	5.020	-9.70	4.948	-.846	.200
.450	1.653	-13.80	3.340	-13.80	3.244	-.797	.225
.500	.762	-16.40	1.540	-16.40	1.477	-.435	.250
.550	.396	-121.00	.800	-121.00	-.412	-.686	.275
.600	1.109	-163.80	2.240	-163.80	-2.151	-.625	.300
.650	1.990	-172.50	4.020	-172.50	-3.986	-.525	.325
.700	2.861	-175.30	5.780	-175.30	-5.761	-.474	.350
.750	3.772	-177.40	7.620	-177.40	-7.612	-.346	.375
.800	4.267	-178.40	8.620	-178.40	-8.617	-.241	.400
.850	4.871	-179.40	9.840	-179.40	-9.839	-.103	.425
.900	5.732	-180.00	11.580	-180.00	-11.580	.000	.450
.950	6.633	-180.60	13.400	-180.60	-13.399	.140	.475
.974	7.484	-180.80	15.120	-180.80	-15.119	.211	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0340 BETAL/BETAC = 1.016 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	6.977	171.70	2.160	49.70	1.397	1.647	.003
.017	5.039	157.80	1.560	35.80	1.265	.913	.025
.033	3.811	135.80	1.180	13.80	1.146	.281	.050
.050	3.424	106.80	1.060	-15.20	1.023	-.278	.075
.067	3.876	81.60	1.200	-40.40	.914	-.778	.100
.083	4.780	63.70	1.480	-58.30	.778	-1.259	.125
.100	5.749	52.60	1.740	-69.40	.626	-1.666	.150
.117	6.783	45.40	2.100	-76.60	.487	-2.043	.175
.133	7.752	40.20	2.400	-81.80	.342	-2.375	.200
.150	8.398	36.50	2.600	-85.50	.204	-2.592	.225
.167	8.850	33.40	2.740	-88.60	.067	-2.739	.250
.183	9.367	30.60	2.900	-91.20	-.061	-2.899	.275
.200	9.173	28.60	2.840	-93.40	-.168	-2.835	.300
.217	8.979	26.50	2.780	-95.50	-.266	-2.767	.325
.233	8.850	24.20	2.740	-97.80	-.372	-2.715	.350
.250	8.075	21.80	2.500	-100.20	-.443	-2.460	.375
.267	7.623	19.40	2.360	-102.60	-.515	-2.303	.400
.283	6.460	16.50	2.000	-105.50	-.534	-1.927	.425
.300	5.426	12.30	1.680	-109.70	-.566	-1.582	.450
.317	4.134	6.70	1.280	-115.30	-.547	-1.157	.475
.333	3.036	-3.60	.940	-125.60	-.547	-.764	.500
.350	1.873	-26.40	.580	-148.40	-.494	-.304	.525
.367	1.486	-75.10	.460	-197.10	-.440	.135	.550
.383	2.196	-113.10	.680	-235.10	-.389	.558	.575
.400	3.295	-129.80	1.020	-251.80	-.319	.969	.600
.417	4.457	-137.80	1.380	-259.80	-.244	1.358	.625
.433	5.491	-142.50	1.700	-264.50	-.163	1.692	.650
.450	6.460	-146.00	2.000	-268.00	-.070	1.999	.675
.467	7.235	-148.50	2.240	-270.50	.020	2.240	.700
.483	8.010	-150.60	2.480	-272.60	.113	2.477	.725
.500	8.463	-152.00	2.620	-274.00	.183	2.614	.750
.517	8.721	-153.70	2.700	-275.70	.268	2.687	.775
.533	8.786	-155.20	2.720	-277.20	.341	2.699	.800
.550	8.592	-157.70	2.660	-279.70	.448	2.622	.825
.567	8.333	-158.20	2.580	-280.20	.457	2.539	.850
.583	7.558	-160.00	2.340	-282.00	.487	2.289	.875
.600	6.783	-162.00	2.100	-284.00	.508	2.038	.900
.617	5.749	-164.70	1.780	-286.70	.511	1.705	.925
.633	4.716	-168.70	1.460	-290.70	.516	1.366	.950
.650	3.488	-174.90	1.080	-296.90	.489	.963	.975
.667	2.326	-187.60	.720	-309.60	.459	.555	1.000
.683	1.421	-219.30	.440	-341.30	.417	.141	1.025
.700	1.486	-275.70	.460	-397.70	.364	-.281	1.050
.717	2.455	-302.70	.760	-424.70	.325	-.687	1.075
.733	3.618	-314.50	1.120	-436.50	.261	-1.089	1.100
.750	4.845	-320.50	1.500	-442.50	.196	-1.487	1.125
.767	5.379	-324.30	1.620	-446.30	.117	-1.816	1.150
.783	6.783	-326.80	2.100	-448.80	.044	-2.100	1.175
.800	7.687	-328.50	2.380	-450.50	-.021	-2.380	1.200
.817	8.204	-330.40	2.540	-452.40	-.106	-2.538	1.225
.833	8.786	-331.20	2.720	-453.20	-.152	-2.716	1.250
.850	8.786	-332.20	2.720	-454.20	-.199	-2.713	1.275
.867	8.592	-333.00	2.660	-455.00	-.232	-2.650	1.300
.883	8.398	-333.80	2.600	-455.80	-.263	-2.587	1.325
.900	7.881	-334.60	2.440	-456.60	-.280	-2.424	1.350
.917	7.235	-335.20	2.240	-457.20	-.281	-2.222	1.375
.933	6.137	-336.00	1.900	-458.00	-.264	-1.882	1.400
.950	5.039	-336.20	1.560	-458.20	-.222	-1.544	1.425
.967	3.811	-337.00	1.180	-459.00	-.185	-1.165	1.450
.983	2.196	-337.50	.680	-459.50	-.112	-.671	1.475
.989	1.421	-337.50	.440	-459.50	-.073	-.434	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	12.000	-5.00	19.200	-5.00	19.127	-1.673	.006
.017	9.000	-6.30	14.400	-6.30	14.313	-1.580	.025
.033	7.900	-8.00	12.640	-8.00	12.517	-1.759	.050
.050	7.200	-10.20	11.520	-10.20	11.338	-2.040	.075
.067	6.700	-12.20	10.720	-12.20	10.478	-2.265	.100
.083	6.000	-14.50	9.600	-14.50	9.294	-2.404	.125
.100	5.300	-17.20	8.480	-17.20	8.101	-2.508	.150
.117	4.550	-21.40	7.280	-21.40	6.778	-2.656	.175
.133	3.700	-23.70	5.920	-23.70	5.421	-2.380	.200
.150	3.000	-34.50	4.800	-34.50	3.956	-2.719	.225
.167	2.213	-46.90	3.540	-46.90	2.419	-2.585	.250
.183	1.600	-72.50	2.560	-72.50	.770	-2.442	.275
.200	1.512	-108.90	2.420	-108.90	-.784	-2.290	.300
.217	1.950	-137.70	3.120	-137.70	-2.308	-2.100	.325
.233	2.700	-154.00	4.320	-154.00	-3.883	-1.894	.350
.250	3.500	-163.00	5.600	-163.00	-5.355	-1.637	.375
.267	4.200	-168.60	6.720	-168.60	-6.587	-1.328	.400
.283	4.800	-172.60	7.680	-172.60	-7.616	-.989	.425
.300	5.250	-175.50	8.400	-175.50	-8.374	-.659	.450
.317	5.650	-177.80	9.040	-177.80	-9.033	-.347	.475
.333	5.750	-179.80	9.200	-179.80	-9.200	-.032	.500
.350	5.900	-181.80	9.440	-181.80	-9.435	.296	.525
.367	5.875	-183.60	9.400	-183.60	-9.381	.590	.550
.383	5.700	-185.30	9.120	-185.30	-9.081	.842	.575
.400	5.400	-186.90	8.640	-186.90	-8.577	1.038	.600
.417	5.000	-189.00	8.000	-189.00	-7.902	1.251	.625
.433	4.400	-191.40	7.040	-191.40	-6.901	1.391	.650
.450	3.825	-194.20	6.120	-194.20	-5.933	1.501	.675
.467	3.125	-198.80	5.000	-198.80	-4.733	1.611	.700
.483	2.325	-206.00	3.720	-206.00	-3.344	1.631	.725
.500	1.550	-220.00	2.480	-220.00	-1.900	1.594	.750
.517	1.000	-254.70	1.600	-254.70	-.422	1.543	.775
.533	1.125	-306.30	1.800	-306.30	1.066	1.451	.800
.550	1.825	-332.50	2.920	-332.50	2.590	1.348	.825
.567	2.625	-343.50	4.200	-343.50	4.027	1.193	.850
.583	3.300	-349.40	5.280	-349.40	5.190	.971	.875
.600	4.000	-353.20	6.400	-353.20	6.355	.758	.900
.617	4.550	-356.00	7.280	-356.00	7.262	.508	.925
.633	5.000	-357.90	8.000	-357.90	7.995	.293	.950
.650	5.350	-359.70	8.560	-359.70	8.560	.045	.975
.667	5.550	-361.00	8.880	-361.00	8.879	-.155	1.000
.683	5.775	-362.20	9.240	-362.20	9.233	-.355	1.025
.700	5.675	-363.40	9.080	-363.40	9.064	-.538	1.050
.717	5.600	-364.70	8.960	-364.70	8.930	-.734	1.075
.733	5.200	-366.00	8.320	-366.00	8.274	-.870	1.100
.750	4.675	-367.00	7.480	-367.00	7.424	-.912	1.125
.767	4.100	-368.50	6.560	-368.50	6.488	-.970	1.150
.783	3.475	-371.50	5.560	-371.50	5.448	-1.108	1.175
.800	2.800	-374.50	4.480	-374.50	4.337	-1.122	1.200
.817	1.975	-378.80	3.160	-378.80	2.991	-1.018	1.225
.833	1.000	-393.00	1.600	-393.00	1.342	-.871	1.250
.850	.512	-457.50	.820	-457.50	-.107	-.813	1.275
.867	1.100	-517.70	1.760	-517.70	-1.628	-.668	1.300
.883	2.025	-531.40	3.240	-531.40	-3.204	-.485	1.325
.900	3.000	-536.50	4.800	-536.50	-4.791	-.293	1.350
.917	3.975	-539.40	6.360	-539.40	-6.360	-.067	1.375
.933	4.600	-541.30	7.360	-541.30	-7.358	.167	1.400
.950	5.300	-542.80	8.480	-542.80	-8.470	.414	1.425
.967	6.350	-544.00	10.160	-544.00	-10.135	.709	1.450
.983	7.400	-545.00	11.840	-545.00	-11.795	1.032	1.475
.991	8.500	-545.40	13.600	-545.40	-13.540	1.280	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0340 BETAL/BETAC = 1.016 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	5.249	173.40	1.940	51.40	1.210	1.516	.003
.025	3.625	158.00	1.340	36.00	1.084	.788	.025
.050	2.651	132.00	.980	10.00	.965	.170	.050
.075	2.543	96.60	.940	-25.40	.849	-.403	.075
.100	3.084	72.00	1.140	-50.00	.733	-.873	.100
.125	4.003	56.70	1.480	-65.30	.618	-1.345	.125
.150	4.923	48.00	1.820	-74.00	.502	-1.749	.150
.175	5.735	42.30	2.120	-79.70	.379	-2.086	.175
.200	6.384	38.20	2.360	-83.80	.255	-2.346	.200
.225	7.087	35.00	2.620	-87.00	.137	-2.616	.225
.250	7.412	32.60	2.740	-89.40	.029	-2.740	.250
.275	7.628	30.40	2.820	-91.60	-.079	-2.819	.275
.300	7.628	28.70	2.820	-93.30	-.162	-2.815	.300
.325	7.520	26.90	2.780	-95.10	-.247	-2.769	.325
.350	7.195	28.00	2.660	-94.00	-.186	-2.654	.350
.375	6.546	23.10	2.420	-98.90	-.374	-2.391	.375
.400	5.843	20.80	2.160	-101.20	-.420	-2.119	.400
.425	5.031	18.40	1.860	-103.60	-.437	-1.808	.425
.450	4.057	14.70	1.500	-107.30	-.446	-1.432	.450
.475	3.030	8.50	1.120	-113.50	-.447	-1.027	.475
.500	2.002	-2.90	.740	-124.90	-.423	-.607	.500
.525	1.136	-34.00	.420	-156.00	-.384	-.171	.525
.550	1.190	-94.60	.440	-216.60	-.353	.262	.550
.575	2.002	-122.70	.740	-244.70	-.316	.669	.575
.600	3.030	-134.20	1.120	-256.20	-.267	1.088	.600
.625	4.112	-140.20	1.520	-262.20	-.206	1.506	.625
.650	5.031	-143.50	1.860	-265.50	-.146	1.854	.650
.675	5.681	-145.70	2.100	-267.70	-.084	2.098	.675
.700	6.438	-147.40	2.380	-269.40	-.025	2.380	.700
.725	6.979	-149.20	2.580	-271.20	.054	2.579	.725
.750	7.358	-149.80	2.720	-271.80	.085	2.719	.750
.775	7.412	-150.80	2.740	-272.80	.134	2.737	.775
.800	7.141	-151.30	2.640	-273.30	.152	2.636	.800
.825	6.979	-152.30	2.580	-274.30	.193	2.573	.825
.850	6.546	-153.00	2.420	-275.00	.211	2.411	.850
.875	6.005	-153.50	2.220	-275.50	.213	2.210	.875
.900	5.031	-153.80	1.860	-275.80	.188	1.850	.900
.925	4.166	-154.00	1.540	-276.00	.161	1.532	.925
.950	3.084	-154.30	1.140	-276.30	.125	1.133	.950
.975	1.893	-154.30	.700	-276.30	.077	.696	.975
.984	1.190	-154.30	.440	-276.30	.048	.437	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	9.984	-5.00	19.200	-5.00	19.127	-1.673	.006
.025	7.342	-5.70	14.120	-5.70	14.050	-1.402	.025
.050	6.439	-6.90	12.380	-6.90	12.290	-1.487	.050
.075	5.793	-9.00	11.140	-9.00	11.003	-1.743	.075
.100	5.346	-10.80	10.280	-10.80	10.098	-1.926	.100
.125	4.742	-12.90	9.120	-12.90	8.890	-2.036	.125
.150	4.139	-15.60	7.960	-15.60	7.667	-2.141	.150
.175	3.494	-19.00	6.720	-19.00	6.354	-2.188	.175
.200	2.870	-24.30	5.520	-24.30	5.031	-2.272	.200
.225	2.142	-32.80	4.120	-32.80	3.463	-2.232	.225
.250	1.508	-48.10	2.900	-48.10	1.937	-2.159	.250
.275	1.123	-79.30	2.160	-79.30	.401	-2.122	.275
.300	1.196	-121.80	2.300	-121.80	-1.212	-1.955	.300
.325	1.747	-146.80	3.360	-146.80	-2.812	-1.840	.325
.350	2.371	-159.30	4.560	-159.30	-4.266	-1.612	.350
.375	2.995	-166.20	5.760	-166.20	-5.594	-1.374	.375
.400	3.546	-170.50	6.820	-170.50	-6.726	-1.126	.400
.425	3.994	-173.80	7.680	-173.80	-7.635	-.829	.425
.450	4.316	-176.20	8.300	-176.20	-8.282	-.550	.450
.475	4.618	-177.90	8.880	-177.90	-8.874	-.325	.475
.500	4.794	-179.50	9.220	-179.50	-9.220	-.080	.500
.525	4.940	-180.70	9.500	-180.70	-9.499	.116	.525
.550	4.846	-182.10	9.320	-182.10	-9.314	.342	.550
.575	4.690	-183.80	9.020	-183.80	-9.000	.598	.575
.600	4.389	-184.80	8.440	-184.80	-8.410	.706	.600
.625	3.994	-186.40	7.680	-186.40	-7.632	.856	.625
.650	3.494	-188.00	6.720	-188.00	-6.655	.935	.650
.675	2.943	-190.70	5.660	-190.70	-5.562	1.051	.675
.700	2.361	-194.00	4.540	-194.00	-4.405	1.098	.700
.725	1.622	-200.00	3.120	-200.00	-2.932	1.067	.725
.750	.832	-216.00	1.600	-216.00	-1.294	.940	.750
.775	.468	-284.00	.900	-284.00	.218	.873	.775
.800	.988	-333.50	1.900	-333.50	1.700	.848	.800
.825	1.747	-348.80	3.360	-348.80	3.296	.653	.825
.850	2.558	-354.40	4.920	-354.40	4.897	.480	.850
.875	3.297	-357.40	6.340	-357.40	6.333	.288	.875
.900	3.848	-359.20	7.400	-359.20	7.399	.103	.900
.925	4.441	-361.00	8.540	-361.00	8.539	-.149	.925
.950	5.294	-362.30	10.180	-362.30	10.172	-.409	.950
.975	6.136	-363.20	11.800	-363.20	11.782	-.659	.975
.987	7.093	-363.60	13.640	-363.60	13.613	-.856	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0340 BETAL/BETAO = 1.016 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	4.649	171.80	1.700	49.80	1.097	1.298	.003
.050	3.227	152.50	1.180	30.50	1.017	.599	.025
.100	2.461	122.00	.900	.00	.900	.000	.050
.150	2.680	90.30	.980	-31.70	.834	-.515	.075
.200	3.337	67.00	1.220	-55.00	.700	-.999	.100
.250	4.321	54.70	1.580	-67.30	.610	-1.458	.125
.300	5.251	47.40	1.920	-74.60	.510	-1.851	.150
.350	6.017	42.40	2.200	-79.60	.397	-2.164	.175
.400	6.783	39.00	2.480	-83.00	.302	-2.462	.200
.450	7.330	36.00	2.680	-86.00	.187	-2.673	.225
.500	7.713	34.50	2.820	-87.50	.123	-2.817	.250
.550	7.767	32.70	2.840	-89.30	.035	-2.840	.275
.600	7.549	31.60	2.760	-90.40	-.019	-2.760	.300
.650	7.275	30.50	2.660	-91.50	-.070	-2.659	.325
.700	6.892	29.40	2.520	-92.60	-.114	-2.517	.350
.750	6.290	28.80	2.300	-93.20	-.128	-2.296	.375
.800	5.306	28.30	1.940	-93.70	-.125	-1.936	.400
.850	4.321	27.70	1.580	-94.30	-.118	-1.576	.425
.900	3.282	27.70	1.200	-94.30	-.090	-1.197	.450
.950	1.769	27.70	.720	-94.30	-.054	-.718	.475
.968	1.313	27.70	.480	-94.30	-.036	-.479	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	9.984	-2.50	19.200	-2.50	19.182	-.837	.006
.050	7.384	-3.20	14.200	-3.20	14.178	-.793	.025
.100	6.438	-4.40	12.380	-4.40	12.344	-.950	.050
.150	5.970	-5.50	11.480	-5.50	11.427	-1.100	.075
.200	5.294	-6.70	10.180	-6.70	10.110	-1.188	.100
.250	4.597	-8.10	8.840	-8.10	8.752	-1.246	.125
.300	3.848	-10.50	7.400	-10.50	7.276	-1.349	.150
.350	3.343	-13.10	6.440	-13.10	6.272	-1.460	.175
.400	2.694	-17.80	5.180	-17.80	4.932	-1.583	.200
.450	1.872	-24.90	3.600	-24.90	3.265	-1.516	.225
.500	1.092	-41.20	2.100	-41.20	1.580	-1.383	.250
.550	.707	-92.50	1.360	-92.50	-.059	-1.359	.275
.600	1.113	-142.90	2.140	-142.90	-1.707	-1.291	.300
.650	1.841	-161.60	3.540	-161.60	-3.359	-1.117	.325
.700	2.694	-168.40	5.180	-168.40	-5.074	-1.042	.350
.750	3.494	-172.50	6.720	-172.50	-6.663	-.877	.375
.800	3.994	-175.20	7.680	-175.20	-7.653	-.643	.400
.850	4.597	-177.30	8.840	-177.30	-8.830	-.416	.425
.900	5.439	-179.10	10.460	-179.10	-10.459	-.164	.450
.950	6.344	-180.40	12.200	-180.40	-12.200	.085	.475
.974	7.186	-180.80	13.820	-180.80	-13.819	.193	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALPHAL/BETAL = .096   BETAL/BETAO = 1.106   H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAO = .0200

A.   MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	8.996	100.00	5.040	20.00	4.736	1.724	.003
.017	8.282	89.00	4.640	5.00	4.583	.726	.025
.033	7.783	79.00	4.360	-1.00	4.359	-.076	.050
.050	7.211	66.40	4.040	-13.60	3.927	-.950	.075
.067	6.890	55.10	3.860	-24.50	3.501	-1.625	.100
.083	6.712	42.80	3.760	-37.20	2.995	-2.273	.125
.100	6.605	29.60	3.700	-50.40	2.358	-2.851	.150
.117	6.712	17.20	3.760	-62.80	1.719	-3.344	.175
.133	6.890	4.20	3.860	-75.80	.947	-3.742	.200
.150	7.211	-7.50	4.040	-87.50	.176	-4.036	.225
.167	7.497	-16.60	4.200	-96.60	-.483	-4.172	.250
.183	7.890	-25.40	4.420	-105.40	-1.174	-4.261	.275
.200	7.997	-33.40	4.480	-113.40	-1.779	-4.112	.300
.217	7.997	-40.50	4.480	-120.50	-2.274	-3.860	.325
.233	8.140	-47.60	4.560	-127.60	-2.782	-3.613	.350
.250	7.961	-53.80	4.460	-133.80	-3.087	-3.219	.375
.267	7.747	-60.00	4.340	-140.00	-3.325	-2.790	.400
.283	7.497	-67.80	4.200	-147.80	-3.554	-2.238	.425
.300	6.997	-73.70	3.920	-153.70	-3.514	-1.737	.450
.317	6.462	-81.00	3.620	-161.00	-3.423	-1.179	.475
.333	5.998	-88.50	3.360	-168.50	-3.293	-.670	.500
.350	5.212	-98.50	2.920	-178.50	-2.919	-.076	.525
.367	4.605	-111.00	2.580	-191.00	-2.533	.492	.550
.383	4.213	-126.80	2.360	-206.80	-2.107	1.064	.575
.400	3.963	-144.60	2.220	-224.60	-1.581	1.559	.600
.417	4.034	-161.80	2.260	-241.80	-1.068	1.992	.625
.433	4.355	-177.90	2.440	-257.90	-.511	2.386	.650
.450	4.855	-188.00	2.720	-268.00	-.095	2.718	.675
.467	5.355	-199.50	3.000	-279.50	.495	2.959	.700
.483	6.105	-207.40	3.420	-287.40	1.023	3.264	.725
.500	6.283	-215.00	3.520	-295.00	1.488	3.190	.750
.517	6.605	-220.50	3.700	-300.50	1.878	3.188	.775
.533	6.783	-225.60	3.800	-305.60	2.212	3.090	.800
.550	6.783	-229.80	3.800	-309.80	2.432	2.919	.825
.567	6.712	-236.00	3.760	-316.00	2.705	2.612	.850
.583	6.390	-237.80	3.580	-317.80	2.652	2.405	.875
.600	5.890	-242.40	3.300	-322.40	2.615	2.013	.900
.617	5.391	-247.00	3.020	-327.00	2.533	1.645	.925
.633	4.712	-252.60	2.640	-332.60	2.344	1.215	.950
.650	3.891	-259.50	2.180	-339.50	2.042	.763	.975
.667	3.106	-270.00	1.740	-350.00	1.714	.302	1.000
.683	2.428	-286.60	1.360	-366.60	1.351	-.156	1.025
.700	1.963	-313.20	1.100	-393.20	.920	-.602	1.050
.717	2.035	-346.70	1.140	-426.70	.451	-1.047	1.075
.733	2.713	-371.00	1.520	-451.00	-.027	-1.520	1.100
.750	3.499	-385.00	1.960	-465.00	-.507	-1.893	1.125
.767	4.105	-393.80	2.300	-473.80	-.928	-2.104	1.150
.783	4.784	-400.00	2.680	-480.00	-1.340	-2.321	1.175
.800	5.641	-403.80	3.160	-483.80	-1.758	-2.626	1.200
.817	6.105	-406.80	3.420	-486.80	-2.049	-2.739	1.225
.833	6.497	-408.50	3.640	-488.50	-2.266	-2.849	1.250
.850	6.497	-411.00	3.640	-491.00	-2.388	-2.747	1.275
.867	6.355	-412.00	3.560	-492.00	-2.382	-2.646	1.300
.883	6.212	-412.80	3.480	-492.80	-2.364	-2.553	1.325
.900	5.890	-414.00	3.300	-494.00	-2.292	-2.374	1.350
.917	5.391	-414.50	3.020	-494.50	-2.117	-2.154	1.375
.933	4.498	-414.80	2.520	-494.80	-1.776	-1.788	1.400
.950	3.606	-415.50	2.020	-495.50	-1.441	-1.416	1.425
.967	2.677	-415.80	1.500	-495.80	-1.075	-1.046	1.450
.983	1.571	-416.00	.880	-496.00	-.633	-.611	1.475
.989	1.142	-416.00	.640	-496.00	-.460	-.445	1.484

B.   MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	15.151	-5.80	25.680	-5.80	25.549	-2.595	.006
.017	11.535	-12.80	20.060	-12.80	19.561	-4.444	.025
.033	11.139	-21.70	18.880	-21.70	17.542	-6.981	.050
.050	11.033	-30.00	18.700	-30.00	16.195	-9.350	.075
.067	11.033	-37.90	18.700	-37.90	14.756	-11.487	.100
.083	10.939	-45.20	18.540	-45.20	13.064	-13.155	.125
.100	10.537	-52.10	17.860	-52.10	10.971	-14.093	.150
.117	10.431	-59.60	17.680	-59.60	8.947	-15.249	.175
.133	9.936	-67.00	16.840	-67.00	6.580	-15.501	.200
.150	9.428	-75.40	15.980	-75.40	4.028	-15.464	.225
.167	8.531	-83.80	14.460	-83.80	1.562	-14.375	.250
.183	7.930	-93.80	13.440	-93.80	-.891	-13.410	.275
.200	7.375	-105.00	12.500	-105.00	-3.235	-12.074	.300
.217	6.927	-117.90	11.740	-117.90	-5.493	-10.375	.325
.233	6.726	-132.00	11.400	-132.00	-7.628	-8.472	.350
.250	6.773	-147.50	11.480	-147.50	-9.682	-6.168	.375
.267	6.726	-160.00	11.400	-160.00	-10.712	-3.899	.400
.283	6.927	-173.00	11.740	-173.00	-11.652	-1.431	.425
.300	7.328	-184.20	12.420	-184.20	-12.387	.910	.450
.317	7.729	-194.50	13.100	-194.50	-12.683	3.280	.475
.333	8.225	-202.30	13.940	-202.30	-12.897	5.290	.500
.350	8.626	-209.00	14.620	-209.00	-12.787	7.088	.525
.367	8.933	-215.30	15.140	-215.30	-12.356	8.749	.550
.383	9.027	-221.00	15.300	-221.00	-11.547	10.038	.575
.400	8.980	-226.50	15.220	-226.50	-10.477	11.040	.600
.417	8.579	-231.50	14.540	-231.50	-9.051	11.379	.625
.433	8.130	-236.80	13.780	-236.80	-7.545	11.531	.650
.450	7.623	-241.20	12.920	-241.20	-6.224	11.322	.675
.467	6.820	-249.20	11.560	-249.20	-4.105	10.807	.700
.483	5.617	-257.90	9.520	-257.90	-1.996	9.308	.725
.500	5.121	-267.20	8.680	-267.20	-.424	8.670	.750
.517	4.319	-280.50	7.320	-280.50	1.334	7.197	.775
.533	3.811	-298.50	6.460	-298.50	3.082	5.677	.800
.550	3.564	-320.50	6.040	-320.50	4.661	3.842	.825
.567	3.811	-338.20	6.460	-338.20	5.998	2.399	.850
.583	4.366	-359.00	7.400	-359.00	7.399	.129	.875
.600	5.216	-361.80	8.840	-361.80	8.836	-.278	.900
.617	5.865	-381.00	9.940	-381.00	9.280	-3.562	.925
.633	6.525	-388.00	11.060	-388.00	9.765	-5.192	.950
.650	7.174	-393.00	12.160	-393.00	10.198	-6.623	.975
.667	7.623	-397.10	12.920	-397.10	10.305	-7.793	1.000
.683	7.930	-400.50	13.440	-400.50	10.220	-8.729	1.025
.700	7.977	-403.80	13.520	-403.80	9.758	-9.358	1.050
.717	7.776	-406.40	13.180	-406.40	9.089	-9.545	1.075
.733	7.422	-411.50	12.580	-411.50	7.831	-9.845	1.100
.750	6.525	-413.00	11.060	-413.00	6.656	-8.833	1.125
.767	5.517	-414.50	9.860	-414.50	5.726	-8.027	1.150
.783	5.121	-417.20	8.680	-417.20	4.702	-7.296	1.175
.800	4.118	-422.00	6.980	-422.00	3.277	-6.163	1.200
.817	3.056	-429.20	5.180	-425.20	1.839	-4.842	1.225
.833	1.841	-445.50	3.120	-445.50	.245	-3.110	1.250
.850	1.133	-491.00	1.920	-491.00	-1.260	-1.449	1.275
.867	1.640	-546.60	2.780	-546.60	-2.762	.320	1.300
.883	2.761	-565.50	4.680	-565.50	-4.224	2.015	1.325
.900	4.012	-573.00	6.800	-573.00	-5.703	3.704	1.350
.917	5.168	-577.00	8.760	-577.00	-6.994	5.272	1.375
.933	5.817	-580.00	9.860	-580.00	-7.553	6.338	1.400
.950	6.726	-581.00	11.400	-581.00	-8.604	7.479	1.425
.967	7.729	-582.00	13.100	-582.00	-9.735	8.766	1.450
.983	8.626	-583.00	14.620	-583.00	-10.692	9.971	1.475
.991	9.629	-583.20	16.320	-583.20	-11.897	11.172	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0980 BETAL/BETAC = 1.106 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	6.640	120.00	4.320	30.00	3.741	2.160	.003
.025	7.520	109.00	3.760	15.00	3.555	1.224	.025
.050	6.720	105.50	3.360	15.50	3.238	.898	.050
.075	6.160	80.00	3.080	-10.00	3.033	-.535	.075
.100	5.800	62.00	2.900	-28.00	2.56.	-1.361	.100
.125	6.000	45.00	3.000	-45.00	2.121	-2.121	.125
.150	6.400	29.50	3.200	-60.50	1.576	-2.785	.150
.175	7.200	17.00	3.600	-73.00	1.053	-3.443	.175
.200	7.800	7.50	3.900	-82.50	.509	-3.867	.200
.225	8.520	-1.00	4.260	-91.00	-.074	-4.259	.225
.250	9.000	-7.60	4.500	-97.60	-.595	-4.460	.250
.275	9.360	-13.50	4.680	-103.50	-1.093	-4.551	.275
.300	9.600	-18.00	4.800	-108.00	-1.483	-4.565	.300
.325	9.560	-22.00	4.780	-112.00	-1.791	-4.432	.325
.350	9.400	-26.80	4.700	-116.80	-2.119	-4.195	.350
.375	9.000	-30.00	4.500	-120.00	-2.250	-3.897	.375
.400	8.200	-34.60	4.100	-124.60	-2.328	-3.375	.400
.425	7.440	-40.00	3.720	-130.00	-2.391	-2.850	.425
.450	6.400	-45.40	3.200	-135.40	-2.278	-2.247	.450
.475	5.440	-52.00	2.720	-142.00	-2.143	-1.675	.475
.500	4.320	-62.20	2.160	-152.20	-1.911	-1.007	.500
.525	3.320	-79.00	1.660	-169.00	-1.630	-.317	.525
.550	2.760	-106.50	1.380	-196.50	-1.323	.392	.550
.575	2.840	-138.00	1.420	-228.00	-.950	1.055	.575
.600	3.600	-162.00	1.800	-252.00	-.556	1.712	.600
.625	4.600	-176.50	2.300	-266.50	-.140	2.296	.625
.650	5.640	-185.00	2.820	-275.00	.246	2.809	.650
.675	6.600	-190.00	3.300	-280.00	.573	3.250	.675
.700	7.520	-194.00	3.760	-284.00	.910	3.648	.700
.725	8.200	-197.20	4.100	-287.20	1.212	3.917	.725
.750	8.800	-199.50	4.400	-289.50	1.469	4.148	.750
.775	8.800	-201.50	4.400	-291.50	1.613	4.094	.775
.800	8.600	-203.00	4.300	-293.00	1.680	3.958	.800
.825	8.400	-204.00	4.200	-294.00	1.708	3.837	.825
.850	7.920	-205.20	3.960	-295.20	1.686	3.583	.850
.875	7.240	-206.00	3.620	-296.00	1.587	3.254	.875
.900	6.000	-206.80	3.000	-296.80	1.353	2.678	.900
.925	4.800	-207.00	2.400	-297.00	1.090	2.138	.925
.950	3.520	-207.70	1.760	-297.70	.818	1.558	.950
.975	2.000	-208.00	1.000	-298.00	.469	.883	.975
.984	1.520	-208.50	.760	-298.50	.363	.668	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	CRMAG	CRFAZ	CNMAG	CNFAZ	CNREAL	CNIMAG	Z/LAMDAO
.006	17.356	-1.20	26.100	-1.20	26.094	-.547	.006
.025	13.672	-6.60	20.560	-6.60	20.424	-2.363	.025
.050	13.273	-13.00	19.960	-13.00	19.448	-4.490	.050
.075	12.967	-18.80	19.500	-18.80	18.460	-6.284	.075
.100	12.568	-24.00	18.900	-24.00	17.266	-7.687	.100
.125	12.276	-29.50	18.460	-29.50	16.067	-9.090	.125
.150	11.478	-35.00	17.260	-35.00	14.139	-9.900	.150
.175	10.573	-40.50	15.900	-40.50	12.090	-10.326	.175
.200	9.576	-47.60	14.400	-47.60	9.710	-10.634	.200
.225	8.379	-56.00	12.600	-56.00	7.046	-10.446	.225
.250	7.089	-67.00	10.660	-67.00	4.165	-9.813	.250
.275	6.184	-81.20	9.300	-81.20	1.423	-9.191	.275
.300	5.386	-100.00	8.100	-100.00	-1.407	-7.977	.300
.325	5.293	-122.60	7.960	-122.60	-4.289	-6.706	.325
.350	5.692	-142.80	8.560	-142.80	-6.818	-5.175	.350
.375	6.490	-158.40	9.760	-158.40	-9.075	-3.593	.375
.400	7.435	-170.20	11.180	-170.20	-11.017	-1.903	.400
.425	8.432	-179.20	12.680	-179.20	-12.679	-.177	.425
.450	9.323	-185.80	14.020	-185.80	-13.948	1.417	.450
.475	9.975	-190.60	15.000	-190.60	-14.744	2.759	.475
.500	10.480	-195.00	15.760	-195.00	-15.223	4.079	.500
.525	10.972	-198.00	16.500	-198.00	-15.692	5.099	.525
.550	11.079	-201.00	16.660	-201.00	-15.553	5.970	.550
.575	10.680	-203.00	16.060	-203.00	-14.783	6.275	.575
.600	10.281	-205.80	15.460	-205.80	-13.919	6.729	.600
.625	9.376	-208.50	14.100	-208.50	-12.391	6.728	.625
.650	8.379	-211.00	12.600	-211.00	-10.800	6.489	.650
.675	7.182	-214.50	10.800	-214.50	-8.901	6.117	.675
.700	5.692	-219.00	8.560	-219.00	-6.652	5.387	.700
.725	4.096	-227.20	6.160	-227.20	-4.185	4.520	.725
.750	2.500	-244.00	3.760	-244.00	-1.648	3.379	.750
.775	1.594	-290.00	2.400	-290.00	.821	2.255	.775
.800	2.341	-342.00	3.520	-342.00	3.348	1.088	.800
.825	3.897	-362.00	5.860	-362.00	5.856	-.204	.825
.850	5.586	-370.00	8.400	-370.00	8.272	-1.459	.850
.875	7.182	-375.00	10.800	-375.00	10.432	-2.795	.875
.900	8.179	-377.00	12.300	-377.00	11.763	-3.596	.900
.925	9.283	-378.80	13.960	-378.80	13.215	-4.499	.925
.950	10.480	-379.80	15.760	-379.80	14.828	-5.338	.950
.975	11.677	-380.80	17.560	-380.80	16.416	-6.236	.975
.987	12.967	-381.00	19.500	-381.00	18.205	-6.988	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALPHAL/BETAL = .0621 BETAL/BETAC = 1.031 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	5.157	130.00	2.780	30.00	2.408	1.390	.003
.017	4.415	112.60	2.380	12.60	2.323	.519	.025
.033	4.044	96.00	2.180	-4.00	2.175	-.152	.050
.050	3.970	79.00	2.140	-21.00	1.998	-.767	.075
.067	4.114	61.50	2.220	-38.50	1.737	-1.382	.100
.083	4.526	49.00	2.440	-51.00	1.536	-1.896	.125
.100	5.009	37.00	2.700	-63.00	1.226	-2.406	.150
.117	5.528	28.20	2.980	-71.80	.931	-2.831	.175
.133	6.010	20.40	3.240	-79.60	.585	-3.187	.200
.150	6.418	14.00	3.460	-86.00	.241	-3.452	.225
.167	6.604	8.80	3.560	-91.20	-.075	-3.559	.250
.183	6.975	3.60	3.760	-96.40	-.419	-3.737	.275
.200	6.864	-.80	3.700	-100.80	-.693	-3.634	.300
.217	6.679	-5.50	3.600	-105.50	-.962	-3.469	.325
.233	6.455	-10.50	3.480	-110.50	-1.219	-3.260	.350
.250	6.196	-15.00	3.340	-115.00	-1.412	-3.027	.375
.267	5.751	-20.00	3.100	-120.00	-1.550	-2.685	.400
.283	5.194	-25.50	2.800	-125.50	-1.626	-2.280	.425
.300	4.526	-32.20	2.440	-132.20	-1.639	-1.808	.450
.317	3.896	-41.60	2.100	-141.60	-1.646	-1.304	.475
.333	3.339	-54.60	1.800	-154.60	-1.626	-.772	.500
.350	2.782	-72.00	1.500	-172.00	-1.485	-.209	.525
.367	2.597	-94.20	1.400	-194.20	-1.357	.343	.550
.383	2.745	-116.00	1.480	-216.00	-1.197	.870	.575
.400	3.191	-135.60	1.720	-235.60	-.972	1.419	.600
.417	3.747	-147.50	2.020	-247.50	-.773	1.866	.625
.433	4.415	-156.60	2.380	-256.60	-.552	2.315	.650
.450	5.009	-163.40	2.700	-263.40	-.310	2.682	.675
.467	5.528	-168.50	2.980	-268.50	-.078	2.979	.700
.483	5.899	-172.80	3.180	-272.80	.155	3.176	.725
.500	6.159	-176.00	3.320	-276.00	.347	3.302	.750
.517	6.344	-179.00	3.420	-275.00	.535	3.378	.775
.533	6.455	-181.80	3.460	-281.80	.712	3.406	.800
.550	6.159	-182.20	3.320	-282.20	.702	3.245	.825
.567	5.973	-187.00	3.220	-287.00	.941	3.079	.850
.583	5.528	-189.50	2.980	-289.50	.995	2.809	.875
.600	4.897	-193.00	2.640	-293.00	1.032	2.430	.900
.617	4.304	-197.00	2.320	-297.00	1.053	2.067	.925
.633	3.524	-203.00	1.900	-303.00	1.035	1.593	.950
.650	2.820	-210.00	1.520	-310.00	.977	1.164	.975
.667	1.966	-225.80	1.060	-325.80	.877	.596	1.000
.683	1.447	-254.80	.780	-354.80	.777	.071	1.025
.700	1.447	-296.00	.780	-396.00	.631	-.458	1.050
.717	2.040	-324.00	1.100	-424.00	.482	-.989	1.075
.733	2.745	-338.00	1.480	-438.00	.308	-1.448	1.100
.750	3.599	-344.20	1.940	-444.20	.196	-1.930	1.125
.767	4.304	-349.00	2.320	-449.00	.040	-2.320	1.150
.783	5.009	-354.00	2.700	-454.00	-.188	-2.693	1.175
.800	5.602	-355.00	3.020	-455.00	-.263	-3.009	1.200
.817	6.159	-357.00	3.320	-457.00	-.405	-3.295	1.225
.833	6.530	-358.50	3.520	-458.50	-.520	-3.481	1.250
.850	6.418	-360.00	3.460	-460.00	-.601	-3.407	1.275
.867	6.270	-360.00	3.380	-460.00	-.587	-3.329	1.300
.883	6.010	-361.00	3.240	-461.00	-.618	-3.180	1.325
.900	5.713	-361.50	3.080	-461.50	-.614	-3.018	1.350
.917	5.305	-362.00	2.860	-462.00	-.595	-2.798	1.375
.933	4.415	-362.50	2.380	-462.50	-.515	-2.324	1.400
.950	3.524	-363.00	1.900	-463.00	-.427	-1.851	1.425
.967	2.597	-363.00	1.400	-463.00	-.315	-1.364	1.450
.983	1.595	-363.00	.860	-463.00	-.193	-.838	1.475
.989	1.150	-363.00	.620	-463.00	-.139	-.604	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.004	13.900	-3.00	22.240	-3.00	22.210	-1.164	.006
.017	10.500	-6.50	16.800	-6.50	16.692	-1.902	.025
.033	9.400	-11.00	15.040	-11.00	14.764	-2.870	.050
.050	8.900	-15.40	14.240	-15.40	13.729	-3.782	.075
.067	8.300	-20.00	13.280	-20.00	12.479	-4.542	.100
.083	7.950	-24.60	12.720	-24.60	11.565	-5.295	.125
.100	7.150	-30.60	11.440	-30.60	9.847	-5.823	.150
.117	6.550	-37.20	10.480	-37.20	8.348	-6.336	.175
.133	5.750	-45.60	9.200	-45.60	6.437	-6.573	.200
.150	5.100	-56.00	8.160	-56.00	4.563	-6.765	.225
.167	4.300	-69.20	6.880	-69.20	2.443	-6.432	.250
.183	3.900	-86.00	6.240	-86.00	.435	-6.225	.275
.200	3.800	-114.50	6.080	-114.50	-2.521	-5.533	.300
.217	4.000	-124.00	6.400	-124.00	-3.579	-5.306	.325
.233	4.550	-140.60	7.280	-140.60	-5.626	-4.621	.350
.250	5.200	-152.80	8.320	-152.80	-7.400	-3.803	.375
.267	5.800	-162.00	9.280	-162.00	-8.826	-2.868	.400
.283	6.400	-169.50	10.240	-169.50	-10.069	-1.866	.425
.300	6.900	-174.50	11.040	-174.50	-10.989	-1.058	.450
.317	7.300	-179.50	11.680	-179.50	-11.680	-.102	.475
.333	7.600	-183.00	12.160	-183.00	-12.143	.636	.500
.350	7.700	-187.00	12.320	-187.00	-12.228	1.501	.525
.367	7.750	-190.50	12.400	-190.50	-12.192	2.260	.550
.383	7.600	-193.50	12.160	-193.50	-11.824	2.839	.575
.400	7.300	-197.00	11.680	-197.00	-11.170	3.415	.600
.417	6.700	-200.50	10.720	-200.50	-10.041	3.754	.625
.433	6.000	-205.00	9.600	-205.00	-8.701	4.057	.650
.450	5.200	-210.00	8.320	-210.00	-7.205	4.160	.675
.467	4.500	-216.00	7.200	-216.00	-5.825	4.232	.700
.483	3.500	-228.00	5.600	-228.00	-3.747	4.162	.725
.500	2.825	-245.50	4.520	-245.50	-1.874	4.113	.750
.517	2.500	-270.50	4.000	-270.50	.035	4.000	.775
.533	2.600	-298.50	4.160	-298.50	1.985	3.656	.800
.550	2.750	-319.00	4.400	-319.00	3.321	2.887	.825
.567	3.600	-337.50	5.760	-337.50	5.322	2.204	.850
.583	4.450	-346.80	7.120	-346.80	6.932	1.626	.875
.600	5.200	-352.20	8.320	-352.20	8.243	1.129	.900
.617	5.950	-356.80	9.520	-356.80	9.505	.531	.925
.633	6.500	-360.00	10.400	-360.00	10.400	-.000	.950
.650	6.900	-363.00	11.040	-363.00	11.025	-.578	.975
.667	7.100	-365.00	11.360	-365.00	11.317	-.990	1.000
.683	7.300	-366.80	11.680	-366.80	11.598	-1.383	1.025
.700	7.200	-370.00	11.520	-370.00	11.345	-2.000	1.050
.717	6.800	-371.00	10.880	-371.00	10.680	-2.076	1.075
.733	6.100	-371.50	9.760	-371.50	9.564	-1.946	1.100
.750	5.600	-373.00	8.960	-373.00	8.730	-2.016	1.125
.767	4.800	-374.00	7.680	-374.00	7.452	-1.858	1.150
.783	4.000	-380.00	6.400	-380.00	6.014	-2.189	1.175
.800	3.200	-382.00	5.120	-382.00	4.747	-1.918	1.200
.817	2.200	-390.00	3.520	-390.00	3.048	-1.760	1.225
.833	1.137	-412.00	1.820	-412.00	1.121	-1.434	1.250
.850	.800	-481.00	1.280	-481.00	-.659	-1.097	1.275
.867	1.650	-523.00	2.640	-523.00	-2.525	-.772	1.300
.883	2.750	-534.00	4.400	-534.00	-4.376	-.460	1.325
.900	4.000	-540.00	6.400	-540.00	-6.400	.000	1.350
.917	5.000	-543.00	8.000	-543.00	-7.989	.419	1.375
.933	5.700	-544.00	9.120	-544.00	-9.098	.636	1.400
.950	6.300	-545.50	10.080	-545.50	-10.034	.966	1.425
.967	7.400	-547.00	11.840	-547.00	-11.752	1.443	1.450
.983	8.500	-548.00	13.600	-548.00	-13.468	1.893	1.475
.991	9.500	-548.00	15.200	-548.00	-15.052	2.115	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0621 BETAL/BETAC = 1.031 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	3.998	170.00	2.240	35.00	1.835	1.285	.003
.025	3.213	151.20	1.800	16.20	1.729	.502	.025
.050	2.963	125.10	1.660	-9.90	1.635	-.285	.050
.075	3.[illegible]34	100.80	1.700	-34.20	1.406	-.956	.075
.100	3.605	82.40	2.020	-52.60	1.227	-1.605	.100
.125	4.284	70.80	2.400	-64.20	1.045	-2.161	.125
.150	4.891	62.30	2.740	-72.70	.815	-2.616	.150
.175	5.605	56.20	3.140	-78.80	.610	-3.080	.175
.200	5.998	51.10	3.300	-83.90	.387	-3.341	.200
.225	6.497	47.20	3.640	-87.80	.140	-3.637	.225
.250	6.712	43.60	3.760	-91.40	-.092	-3.759	.250
.275	6.712	40.50	3.760	-94.50	-.295	-3.748	.275
.300	6.712	38.00	3.760	-97.00	-.458	-3.732	.300
.325	6.533	34.80	3.660	-100.20	-.648	-3.602	.325
.350	6.140	32.50	3.440	-102.50	-.745	-3.358	.350
.375	5.641	30.00	3.160	-105.00	-.818	-3.052	.375
.400	4.891	26.00	2.740	-109.00	-.892	-2.591	.400
.425	4.284	22.00	2.400	-113.00	-.938	-2.209	.425
.450	3.391	15.80	1.900	-115.20	-.927	-1.659	.450
.475	2.713	7.30	1.520	-127.70	-.930	-1.203	.475
.500	1.892	-9.50	1.060	-144.50	-.863	-.616	.500
.525	1.392	-42.00	.780	-177.00	-.779	-.041	.525
.550	1.571	-85.00	.860	-220.00	-.674	.566	.550
.575	2.285	-109.00	1.280	-244.00	-.561	1.150	.575
.600	3.142	-121.00	1.760	-256.00	-.426	1.708	.600
.625	3.891	-127.00	2.180	-262.00	-.303	2.159	.625
.650	4.712	-131.70	2.640	-266.70	-.152	2.636	.650
.675	5.355	-134.20	3.000	-265.20	-.042	3.000	.675
.700	5.998	-136.50	3.360	-271.50	.088	3.359	.700
.725	6.355	-138.00	3.560	-273.00	.186	3.555	.725
.750	6.712	-139.50	3.760	-274.50	.295	3.748	.750
.775	6.533	-141.00	3.660	-276.00	.383	3.640	.775
.800	6.497	-141.40	3.640	-276.40	.406	3.617	.800
.825	6.247	-141.80	3.500	-276.80	.414	3.475	.825
.850	5.890	-143.00	3.300	-278.00	.459	3.268	.850
.875	5.391	-143.50	3.020	-278.50	.446	2.987	.875
.900	4.498	-144.20	2.520	-275.20	.403	2.488	.900
.925	3.499	-144.80	1.960	-275.80	.334	1.931	.925
.950	2.713	-145.50	1.520	-280.50	.277	1.495	.950
.975	1.642	-146.00	.920	-281.00	.176	.903	.975
.984	1.142	-146.00	.640	-281.00	.122	.628	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	14.100	-2.00	22.560	-2.00	22.546	-.787	.006
.025	10.500	-4.50	16.800	-4.50	16.748	-1.318	.025
.050	9.500	-7.50	15.200	-7.50	15.070	-1.984	.050
.075	8.650	-10.50	13.840	-10.50	13.608	-2.522	.075
.100	8.000	-14.20	12.800	-14.20	12.409	-3.140	.100
.125	6.700	-18.20	10.720	-18.20	10.184	-3.348	.125
.150	6.400	-22.70	10.240	-22.70	9.447	-3.952	.150
.175	5.600	-28.50	8.960	-28.50	7.874	-4.275	.175
.200	4.600	-36.50	7.360	-36.50	5.916	-4.378	.200
.225	3.550	-48.00	5.680	-48.00	3.801	-4.221	.225
.250	2.850	-66.00	4.560	-66.00	1.855	-4.166	.250
.275	2.475	-93.00	3.960	-93.00	-.207	-3.955	.275
.300	2.650	-122.00	4.240	-122.00	-2.247	-3.596	.300
.325	3.300	-143.00	5.280	-143.00	-4.217	-3.178	.325
.350	4.100	-155.80	6.560	-155.80	-5.984	-2.689	.350
.375	5.000	-164.30	8.000	-164.30	-7.702	-2.165	.375
.400	5.750	-170.00	9.200	-170.00	-9.060	-1.598	.400
.425	6.400	-174.30	10.240	-174.30	-10.189	-1.017	.425
.450	7.000	-177.20	11.200	-177.20	-11.187	-.547	.450
.475	7.400	-179.80	11.840	-179.80	-11.840	-.041	.475
.500	7.600	-182.00	12.160	-182.00	-12.153	.424	.500
.525	7.800	-184.50	12.480	-184.50	-12.442	.979	.525
.550	7.700	-186.20	12.320	-186.20	-12.248	1.331	.550
.575	7.300	-188.00	11.680	-188.00	-11.566	1.626	.575
.600	6.850	-189.60	10.960	-185.60	-10.807	1.828	.600
.625	6.100	-191.80	9.760	-191.80	-9.554	1.996	.625
.650	5.300	-194.00	8.480	-194.00	-8.228	2.051	.650
.675	4.400	-196.80	7.040	-196.80	-6.740	2.035	.675
.700	3.400	-201.00	5.440	-201.00	-5.079	1.950	.700
.725	2.225	-209.20	3.560	-209.20	-3.108	1.737	.725
.750	1.050	-236.00	1.680	-236.00	-.939	1.393	.750
.775	.950	-307.00	1.520	-307.00	.915	1.214	.775
.800	1.950	-343.00	3.120	-343.00	2.984	.912	.800
.825	3.050	-354.00	4.880	-354.00	4.853	.510	.825
.850	4.300	-358.00	6.880	-358.00	6.876	.240	.850
.875	5.450	-361.00	8.720	-361.00	8.719	-.152	.875
.900	6.000	-362.80	9.600	-362.80	9.589	-.469	.900
.925	6.950	-364.00	11.120	-364.00	11.093	-.776	.925
.950	7.900	-365.00	12.640	-365.00	12.592	-1.102	.950
.975	9.000	-365.50	14.400	-365.50	14.334	-1.380	.975
.987	10.200	-365.60	16.320	-365.60	16.242	-1.593	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0980 BETAL/BETAC = 1.106 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	4.800	130.00	2.400	45.00	1.697	1.697	.003
.050	3.600	111.80	1.800	26.80	1.607	.812	.025
.100	3.000	84.80	1.500	-.20	1.500	-.005	.050
.150	3.160	53.40	1.580	-31.60	1.346	-.828	.075
.200	4.000	31.00	2.000	-54.00	1.176	-1.618	.100
.250	5.000	18.20	2.500	-66.80	.985	-2.298	.125
.300	6.000	8.50	3.000	-76.50	.700	-2.917	.150
.350	7.000	3.00	3.500	-82.00	.487	-3.466	.175
.400	8.000	-1.00	4.000	-86.00	.279	-3.990	.200
.450	8.600	-4.20	4.300	-89.20	.060	-4.300	.225
.500	9.120	-6.50	4.560	-91.50	-.119	-4.558	.250
.550	9.760	-8.80	4.880	-93.80	-.323	-4.869	.275
.600	9.520	-10.00	4.760	-95.00	-.415	-4.742	.300
.650	9.120	-11.10	4.560	-96.10	-.485	-4.534	.325
.700	8.520	-12.60	4.260	-97.60	-.563	-4.223	.350
.750	7.920	-13.50	3.960	-98.50	-.585	-3.917	.375
.800	6.600	-14.40	3.300	-99.40	-.539	-3.256	.400
.850	5.160	-15.00	2.580	-100.00	-.448	-2.541	.425
.900	3.760	-16.00	1.880	-101.00	-.359	-1.845	.450
.950	2.200	-17.00	1.100	-102.00	-.229	-1.076	.475
.968	1.560	-17.50	.780	-102.50	-.169	-.762	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.012	16.293	.50	25.260	.50	25.259	.220	.006
.050	13.003	-1.80	20.160	-1.80	20.150	-.633	.025
.100	11.700	-5.80	18.140	-5.80	18.047	-1.833	.050
.150	11.004	-7.50	17.060	-7.50	16.914	-2.227	.075
.200	10.501	-10.00	16.280	-10.00	16.033	-2.827	.100
.250	9.494	-12.80	14.720	-12.80	14.354	-3.261	.125
.300	8.501	-16.00	13.180	-16.00	12.669	-3.633	.150
.350	7.138	-19.50	11.160	-19.50	10.520	-3.725	.175
.400	5.702	-25.00	8.840	-25.00	8.012	-3.736	.200
.450	3.999	-34.00	6.200	-34.00	5.140	-3.467	.225
.500	2.399	-54.40	3.720	-54.40	2.165	-3.025	.250
.550	1.780	-94.50	2.760	-94.50	-.217	-2.751	.275
.600	2.864	-148.00	4.440	-148.00	-3.765	-2.353	.300
.650	4.605	-164.00	7.140	-164.00	-6.863	-1.968	.325
.700	6.398	-172.60	9.920	-172.60	-9.837	-1.278	.350
.750	7.895	-177.00	12.240	-177.00	-12.223	-.641	.375
.800	8.953	-179.50	13.880	-179.50	-13.879	-.121	.400
.850	9.797	-181.50	15.500	-181.50	-15.495	.406	.425
.900	11.300	-183.00	17.520	-183.00	-17.496	.917	.450
.950	12.603	-184.00	19.540	-184.00	-19.492	1.363	.475
.974	14.100	-184.00	21.860	-184.00	-21.807	1.525	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0621 BETAL/BETAC = 1.031 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	3.203	150.00	1.540	50.00	.990	1.180	.003
.050	[illegible]	120.80	1.000	20.80	.935	.355	.025
.100	1.997	76.60	.960	-23.40	.881	-.381	.050
.150	2.746	46.30	1.320	-53.70	.781	-1.064	.075
.200	3.786	37.20	1.820	-62.80	.832	-1.619	.100
.250	4.784	24.40	2.300	-75.60	.572	-2.228	.125
.300	5.782	20.20	2.780	-79.80	.492	-2.736	.150
.350	[illegible]	16.50	3.120	-83.50	.353	-3.100	.175
.400	7.197	14.00	3.460	-86.00	.241	-3.452	.200
.450	7.779	12.20	3.740	-87.80	.144	-3.737	.225
.500	7.987	11.40	3.840	-88.60	.094	-3.839	.250
.550	[illegible]	9.50	3.860	-90.50	-.034	-3.860	.275
.600	7.779	7.50	3.740	-92.50	-.163	-3.736	.300
.650	7.530	7.50	3.620	-92.50	-.158	-3.617	.325
.700	[illegible]	7.00	3.400	-93.00	-.178	-3.395	.350
.750	[illegible]	6.50	3.120	-93.50	-.190	-3.114	.375
.800	[illegible]	6.00	2.620	-94.00	-.183	-2.614	.400
.850	4.285	5.50	2.060	-94.50	-.162	-2.054	.425
.900	3.?74	5.00	1.440	-95.00	-.129	-1.474	.450
.950	1.914	5.00	.920	-95.00	-.080	-.916	.475
.968	1.373	5.00	.660	-95.00	-.058	-.657	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.012	15.816	2.00	20.540	2.00	20.527	.717	.006
.050	11.813	-3.20	15.340	-3.20	15.316	-.856	.025
.100	[illegible]	-4.80	13.520	-4.80	13.473	-1.131	.050
.150	9.563	-6.20	12.420	-6.20	12.347	-1.341	.075
.200	[illegible]	-8.20	11.440	-8.20	11.323	-1.632	.100
.250	7.561	-10.00	9.820	-10.00	9.671	-1.705	.125
.300	[illegible]	-12.50	8.580	-12.50	8.377	-1.857	.150
.350	[illegible]	-15.00	7.020	-15.00	6.781	-1.817	.175
.400	4.112	-19.50	5.340	-19.50	5.034	-1.783	.200
.450	2.757	-28.80	3.560	-28.80	3.137	-1.725	.225
.500	1.355	-56.50	1.760	-56.50	.971	-1.466	.250
.550	1.247	-125.00	1.620	-125.00	-.929	-1.327	.275
.600	[illegible]	-158.50	3.120	-158.50	-2.903	-1.143	.300
.650	[illegible]	-169.60	4.940	-169.60	-4.859	-.892	.325
.700	5.251	-174.20	6.820	-174.20	-6.785	-.689	.350
.750	[illegible]	-177.50	8.520	-177.50	-8.512	-.372	.375
.800	[illegible]	-179.40	9.620	-179.40	-9.619	-.101	.400
.850	[illegible]	-180.80	10.980	-180.80	-10.979	.153	.425
.900	[illegible]	-181.50	12.360	-181.50	-12.356	.324	.450
.950	10.765	-182.20	13.940	-182.20	-13.970	.537	.475
.974	[illegible]	-182.50	15.860	-182.50	-15.845	.692	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0438 BETAL/BETAC = 1.011 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	1.416	150.00	1.940	45.00	1.372	1.372	.003
.017	1.064	130.00	1.460	25.00	1.323	.617	.025
.033	.943	102.00	1.300	-3.00	1.298	-.068	.050
.050	1.007	77.80	1.380	-27.20	1.227	-.631	.075
.067	1.197	57.50	1.640	-47.50	1.108	-1.209	.100
.083	1.445	46.40	1.960	-58.60	1.032	-1.690	.125
.100	1.694	38.00	2.320	-67.00	.906	-2.136	.150
.117	1.913	32.00	2.620	-73.00	.766	-2.506	.175
.133	2.102	27.00	2.880	-78.00	.599	-2.817	.200
.150	2.278	23.00	3.120	-82.00	.434	-3.090	.225
.167	2.336	20.00	3.200	-85.00	.279	-3.188	.250
.183	2.424	16.50	3.320	-88.50	.087	-3.319	.275
.200	2.380	14.00	3.260	-91.00	-.057	-3.260	.300
.217	2.263	8.50	3.100	-96.50	-.351	-3.080	.325
.233	2.190	8.00	3.000	-97.00	-.366	-2.978	.350
.250	1.986	4.50	2.720	-100.50	-.496	-2.674	.375
.267	1.796	.00	2.460	-105.00	-.637	-2.376	.400
.283	1.562	-4.60	2.140	-109.60	-.718	-2.016	.425
.300	1.256	-11.00	1.720	-116.00	-.754	-1.546	.450
.317	1.037	-24.50	1.420	-129.50	-.903	-1.096	.475
.333	.774	-39.00	1.060	-144.00	-.858	-.623	.500
.350	.599	-67.00	.820	-172.00	-.812	-.114	.525
.367	.657	-100.50	.900	-205.50	-.812	.387	.550
.383	.847	-122.80	1.160	-227.80	-.779	.859	.575
.400	1.095	-137.50	1.500	-242.50	-.693	1.331	.600
.417	1.372	-145.50	1.880	-250.50	-.628	1.772	.625
.433	1.635	-150.80	2.240	-255.80	-.549	2.172	.650
.450	1.840	-155.00	2.520	-260.00	-.438	2.482	.675
.467	2.000	-158.00	2.740	-263.00	-.334	2.720	.700
.483	2.175	-160.50	2.980	-265.50	-.234	2.971	.725
.500	2.248	-162.50	3.080	-267.50	-.134	3.077	.750
.517	2.278	-164.60	3.120	-269.60	-.022	3.120	.775
.533	2.263	-166.50	3.100	-271.50	.081	3.099	.800
.550	2.190	-168.50	3.000	-273.50	.183	2.994	.825
.567	2.044	-170.50	2.800	-275.50	.268	2.787	.850
.583	1.883	-172.60	2.580	-277.60	.341	2.557	.875
.600	1.635	-175.80	2.240	-280.80	.420	2.200	.900
.617	1.372	-179.00	1.880	-284.00	.455	1.824	.925
.633	1.095	-183.40	1.500	-288.40	.473	1.423	.950
.650	.832	-191.00	1.140	-296.00	.500	1.025	.975
.667	.526	-208.00	.720	-313.00	.491	.527	1.000
.683	.350	-249.00	.480	-354.00	.477	.050	1.025
.700	.482	-296.00	.660	-401.00	.498	-.433	1.050
.717	.745	-318.60	1.020	-423.60	.484	-.914	1.075
.733	1.051	-328.00	1.440	-433.00	.421	-1.377	1.100
.750	1.343	-333.10	1.840	-438.10	.379	-1.800	1.125
.767	1.591	-336.20	2.180	-441.20	.334	-2.154	1.150
.783	1.810	-338.00	2.480	-443.00	.302	-2.462	1.175
.800	2.044	-340.00	2.800	-445.00	.244	-2.789	1.200
.817	2.190	-342.00	3.000	-447.00	.157	-2.996	1.225
.833	2.336	-342.20	3.200	-447.20	.156	-3.196	1.250
.850	2.321	-343.20	3.180	-448.20	.100	-3.178	1.275
.867	2.248	-344.00	3.080	-449.00	.054	-3.080	1.300
.883	2.190	-344.50	3.000	-449.50	.026	-3.000	1.325
.900	2.088	-345.50	2.860	-450.50	-.025	-2.860	1.350
.917	1.913	-346.00	2.620	-451.00	-.046	-2.620	1.375
.933	1.635	-346.20	2.240	-451.20	-.047	-2.240	1.400
.950	1.285	-346.50	1.760	-451.50	-.046	-1.759	1.425
.967	.964	-346.80	1.320	-451.80	-.041	-1.319	1.450
.983	.686	-346.00	.940	-451.00	-.016	-.940	1.475
.989	.409	-346.00	.560	-451.00	-.010	-.560	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	4.956	-2.20	20.660	-2.20	20.645	-.793	.006
.017	3.696	-4.10	15.400	-4.10	15.361	-1.101	.025
.033	3.158	-7.20	13.160	-7.20	13.056	-1.649	.050
.050	2.918	-10.00	12.160	-10.00	11.975	-2.112	.075
.067	2.683	-13.40	11.180	-13.40	10.876	-2.591	.100
.083	2.390	-17.00	9.960	-17.00	9.525	-2.912	.125
.100	2.078	-21.50	8.660	-21.50	8.057	-3.174	.150
.117	1.810	-26.50	7.540	-26.50	6.748	-3.364	.175
.133	1.488	-34.50	6.200	-34.50	5.110	-3.512	.200
.150	1.205	-46.60	5.020	-46.60	3.449	-3.647	.225
.167	.922	-65.60	3.840	-65.60	1.586	-3.497	.250
.183	.826	-93.00	3.440	-93.00	-.180	-3.435	.275
.200	.912	-120.00	3.800	-120.00	-1.900	-3.291	.300
.217	1.128	-140.00	4.700	-140.00	-3.600	-3.021	.325
.233	1.440	-152.30	6.000	-152.30	-5.312	-2.789	.350
.250	1.752	-160.60	7.300	-160.60	-6.886	-2.425	.375
.267	2.002	-166.00	8.340	-166.00	-8.092	-2.018	.400
.283	2.208	-170.50	9.200	-170.50	-9.074	-1.518	.425
.300	2.381	-174.00	9.920	-174.00	-9.866	-1.037	.450
.317	2.506	-178.60	10.440	-178.60	-10.437	-.255	.475
.333	2.578	-180.00	10.740	-180.00	-10.740	.000	.500
.350	2.597	-182.00	10.820	-182.00	-10.813	.378	.525
.367	2.568	-184.00	10.700	-184.00	-10.674	.746	.550
.383	2.477	-187.00	10.320	-187.00	-10.243	1.258	.575
.400	2.333	-189.00	9.720	-185.00	-9.600	1.521	.600
.417	2.098	-192.00	8.740	-192.00	-8.549	1.817	.625
.433	1.848	-195.00	7.700	-195.00	-7.438	1.993	.650
.450	1.555	-200.00	6.480	-200.00	-6.089	2.216	.675
.467	1.243	-207.00	5.180	-207.00	-4.615	2.352	.700
.483	.902	-218.00	3.760	-218.00	-2.963	2.315	.725
.500	.624	-239.00	2.600	-239.00	-1.339	2.229	.750
.517	.523	-281.00	2.180	-281.00	.416	2.140	.775
.533	.691	-315.00	2.880	-315.00	2.036	2.036	.800
.550	.974	-331.50	4.060	-331.50	3.568	1.937	.825
.567	1.282	-343.00	5.340	-343.00	5.107	1.561	.850
.583	1.613	-349.00	6.720	-345.00	6.597	1.282	.875
.600	1.896	-352.50	7.900	-352.50	7.832	1.031	.900
.617	2.141	-355.50	8.920	-355.50	8.893	.700	.925
.633	2.333	-358.00	9.720	-358.00	9.714	.339	.950
.650	2.458	-360.00	10.240	-360.00	10.240	-.000	.975
.667	2.530	-361.00	10.540	-361.00	10.538	-.184	1.000
.683	2.578	-362.80	10.740	-362.80	10.727	-.525	1.025
.700	2.515	-364.00	10.480	-364.00	10.454	-.731	1.050
.717	2.371	-365.20	9.880	-365.20	9.839	-.895	1.075
.733	2.218	-366.00	9.240	-366.00	9.189	-.966	1.100
.750	1.963	-367.00	8.180	-367.00	8.119	-.997	1.125
.767	1.718	-368.00	7.160	-368.00	7.090	-.996	1.150
.783	1.430	-370.00	5.960	-370.00	5.869	-1.035	1.175
.800	1.118	-372.50	4.660	-372.50	4.550	-1.009	1.200
.817	.739	-379.00	3.080	-379.00	2.912	-1.003	1.225
.833	.350	-397.00	1.460	-397.00	1.166	-.879	1.250
.850	.245	-483.00	1.020	-483.00	-.556	-.855	1.275
.867	.571	-522.00	2.380	-522.00	-2.264	-.735	1.300
.883	.974	-531.00	4.060	-531.00	-4.010	-.635	1.325
.900	1.382	-535.00	5.760	-535.00	-5.738	-.502	1.350
.917	1.762	-538.00	7.340	-538.00	-7.336	-.256	1.375
.933	1.992	-539.50	8.300	-539.50	-8.300	-.072	1.400
.950	2.314	-540.80	9.640	-540.80	-9.639	.135	1.425
.967	2.674	-542.00	11.140	-542.00	-11.133	.389	1.450
.983	3.086	-542.50	12.860	-542.50	-12.848	.561	1.475
.991	3.499	-543.00	14.580	-543.00	-14.560	.763	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0438 BETAL/BETAC = 1.011 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	2.948	150.00	1.620	48.00	1.084	1.204	.003
.025	2.038	127.00	1.120	25.00	1.015	.473	.025
.050	1.820	91.00	1.000	-11.00	.982	-.191	.050
.075	2.220	59.00	1.220	-43.00	.892	-.832	.075
.100	2.912	42.60	1.600	-59.40	.814	-1.377	.100
.125	3.604	33.00	1.980	-65.00	.710	-1.848	.125
.150	4.295	27.00	2.360	-75.00	.611	-2.280	.150
.175	4.805	22.80	2.640	-79.20	.495	-2.593	.175
.200	5.424	19.50	2.980	-82.50	.389	-2.955	.200
.225	5.751	17.20	3.160	-84.80	.286	-3.147	.225
.250	5.897	15.00	3.240	-87.00	.170	-3.236	.250
.275	5.897	12.80	3.240	-85.20	.045	-3.240	.275
.300	5.970	11.00	3.280	-91.00	-.057	-3.280	.300
.325	5.715	9.00	3.140	-93.00	-.164	-3.136	.325
.350	5.424	7.50	2.980	-94.50	-.234	-2.971	.350
.375	4.914	5.50	2.700	-96.50	-.306	-2.683	.375
.400	4.222	3.00	2.320	-99.00	-.363	-2.291	.400
.425	3.604	.00	1.980	-102.00	-.412	-1.937	.425
.450	2.766	-5.00	1.520	-107.00	-.444	-1.454	.450
.475	2.038	-12.00	1.120	-114.00	-.456	-1.023	.475
.500	1.238	-29.00	.680	-131.00	-.446	-.513	.500
.525	.801	-76.00	.440	-178.00	-.440	-.015	.525
.550	1.201	-130.00	.660	-232.00	-.406	.520	.550
.575	1.966	-147.50	1.080	-245.50	-.378	1.012	.575
.600	2.803	-155.00	1.540	-257.00	-.346	1.501	.600
.625	3.494	-158.50	1.920	-260.50	-.317	1.894	.625
.650	4.222	-161.50	2.320	-263.50	-.263	2.305	.650
.675	4.805	-163.00	2.640	-265.00	-.230	2.630	.675
.700	5.314	-164.50	2.920	-266.50	-.178	2.915	.700
.725	5.606	-166.00	3.080	-268.00	-.107	3.078	.725
.750	5.970	-167.00	3.280	-269.00	-.057	3.280	.750
.775	5.897	-168.00	3.240	-270.00	.000	3.240	.775
.800	5.715	-168.50	3.140	-270.50	.027	3.140	.800
.825	5.132	-169.00	2.820	-271.00	.049	2.820	.825
.850	5.205	-170.00	2.860	-272.00	.100	2.858	.850
.875	4.768	-170.00	2.620	-272.00	.091	2.618	.875
.900	3.895	-170.00	2.140	-272.00	.075	2.139	.900
.925	3.203	-170.50	1.760	-272.50	.077	1.758	.925
.950	2.366	-171.00	1.300	-273.00	.068	1.298	.950
.975	1.456	-171.50	.800	-273.50	.049	.799	.975
.984	1.019	-171.00	.560	-273.00	.029	.559	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	12.792	-2.00	20.800	-2.00	20.787	-.726	.006
.025	9.496	-3.30	15.440	-3.30	15.414	-.889	.025
.050	8.290	-4.50	13.480	-4.50	13.438	-1.058	.050
.075	7.491	-6.50	12.180	-6.50	12.102	-1.379	.075
.100	6.802	-9.00	11.060	-9.00	10.924	-1.730	.100
.125	6.002	-11.50	9.760	-11.50	9.564	-1.946	.125
.150	5.092	-15.00	8.280	-15.00	7.998	-2.143	.150
.175	4.243	-19.00	6.900	-19.00	6.524	-2.246	.175
.200	3.296	-25.00	5.360	-25.00	4.858	-2.265	.200
.225	2.534	-36.00	4.120	-36.00	3.333	-2.422	.225
.250	1.648	-59.00	2.680	-59.00	1.380	-2.297	.250
.275	1.427	-101.50	2.320	-101.50	-.463	-2.273	.275
.300	1.894	-135.50	3.080	-135.50	-2.197	-2.159	.300
.325	2.583	-152.50	4.200	-152.50	-3.725	-1.939	.325
.350	3.604	-162.00	5.860	-162.00	-5.573	-1.811	.350
.375	4.403	-167.40	7.160	-167.40	-6.988	-1.562	.375
.400	5.092	-171.00	8.280	-171.00	-8.178	-1.295	.400
.425	5.793	-173.50	9.420	-173.50	-9.359	-1.066	.425
.450	6.199	-175.60	10.080	-175.60	-10.050	-.773	.450
.475	6.544	-177.20	10.640	-177.20	-10.627	-.520	.475
.500	6.691	-178.60	10.880	-178.60	-10.877	-.266	.500
.525	6.802	-180.00	11.060	-180.00	-11.060	.000	.525
.550	6.691	-181.00	10.880	-181.00	-10.878	.190	.550
.575	6.298	-182.00	10.240	-182.00	-10.234	.357	.575
.600	5.892	-183.00	9.580	-183.00	-9.567	.501	.600
.625	5.203	-184.00	8.460	-184.00	-8.439	.590	.625
.650	4.403	-184.00	7.160	-184.00	-7.143	.499	.650
.675	3.604	-187.00	5.860	-187.00	-5.816	.714	.675
.700	2.694	-191.50	4.380	-191.50	-4.292	.873	.700
.725	1.722	-198.00	2.800	-198.00	-2.663	.865	.725
.750	.726	-223.00	1.180	-223.00	-.863	.805	.750
.775	.726	-320.00	1.180	-320.00	.904	.758	.775
.800	1.660	-344.00	2.700	-344.00	2.595	.744	.800
.825	2.694	-353.50	4.380	-353.50	4.352	.496	.825
.850	3.801	-357.00	6.180	-357.00	6.172	.323	.850
.875	4.699	-359.00	7.640	-359.00	7.639	.133	.875
.900	5.350	-360.20	8.700	-360.20	8.700	-.030	.900
.925	6.101	-361.00	9.920	-361.00	9.918	-.173	.925
.950	6.999	-361.40	11.380	-361.40	11.377	-.278	.950
.975	8.093	-362.00	13.160	-362.00	13.152	-.459	.975
.987	9.093	-362.50	14.780	-362.50	14.766	-.645	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALPHA/BETAL = .0350 BETAL/BETAC = 1.004 H/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .2900

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.002	[illegible]	140.00	1.820	40.00	1.394	1.170	.003
.017	[illegible]	121.00	1.360	21.00	1.270	.487	.025
.033	[illegible]	95.50	1.200	-4.50	1.196	-.094	.050
.050	[illegible]	70.00	1.240	-30.00	1.074	-.620	.075
.067	[illegible]	51.00	1.440	-49.00	.945	-1.087	.100
.083	[illegible]	38.50	1.680	-61.50	.802	-1.476	.125
.100	[illegible]	30.00	1.960	-70.00	.670	-1.842	.150
.117	[illegible]	24.00	2.200	-76.00	.532	-2.135	.175
.133	[illegible]	19.00	2.440	-81.00	.382	-2.410	.200
.150	[illegible]	15.80	2.640	-84.20	.267	-2.626	.225
.167	[illegible]	12.40	2.740	-87.60	.115	-2.738	.250
.183	[illegible]	9.50	2.780	-90.50	-.024	-2.780	.275
.200	[illegible]	7.00	2.680	-93.00	-.140	-2.676	.300
.217	[illegible]	4.20	2.600	-95.80	-.263	-2.587	.325
.233	[illegible]	1.70	2.480	-98.30	-.358	-2.454	.350
.250	4.594	.00	2.200	-100.00	-.382	-2.167	.375
.267	4.096	-4.50	1.960	-104.50	-.491	-1.898	.400
.283	3.678	-8.50	1.760	-108.50	-.558	-1.669	.425
.300	2.968	-14.00	1.420	-114.00	-.578	-1.297	.450
.317	2.215	-21.50	1.060	-121.50	-.554	-.904	.475
.333	1.588	-40.00	.760	-140.00	-.582	-.489	.500
.350	1.170	-71.00	.560	-171.00	-.553	-.088	.525
.367	1.254	-112.50	.600	-212.50	-.506	.322	.550
.383	1.756	-137.00	.840	-237.00	-.457	.704	.575
.400	2.466	-150.50	1.180	-250.50	-.394	1.112	.600
.417	3.093	-157.60	1.480	-257.60	-.318	1.445	.625
.433	3.720	-162.20	1.780	-262.20	-.242	1.764	.650
.450	4.222	-165.20	2.020	-265.20	-.169	2.013	.675
.467	4.598	-168.50	2.200	-268.50	-.058	2.199	.700
.483	5.016	-170.50	2.400	-270.50	.021	2.400	.725
.500	5.309	-175.00	2.540	-275.00	.221	2.530	.750
.517	5.518	-176.20	2.640	-276.20	.285	2.625	.775
.533	5.601	-177.00	2.680	-277.00	.327	2.660	.800
.550	5.100	-177.00	2.440	-277.00	.297	2.422	.825
.567	4.723	-179.00	2.260	-279.00	.354	2.232	.850
.583	4.347	-181.00	2.080	-281.00	.397	2.042	.875
.600	3.762	-184.00	1.800	-284.00	.435	1.747	.900
.617	3.219	-187.00	1.540	-287.00	.450	1.473	.925
.633	2.550	-191.60	1.220	-291.60	.449	1.134	.950
.650	1.839	-195.00	.880	-295.00	.372	.798	.975
.667	1.170	-218.00	.560	-318.00	.416	.375	1.000
.683	.836	-262.00	.400	-362.00	.400	-.014	1.025
.700	1.170	-309.00	.560	-409.00	.367	-.423	1.050
.717	1.839	-328.00	.880	-428.00	.330	-.816	1.075
.733	2.592	-337.00	1.240	-437.00	.279	-1.208	1.100
.750	3.260	-341.50	1.560	-441.50	.231	-1.543	1.125
.767	3.846	-345.40	1.840	-445.40	.148	-1.834	1.150
.783	4.598	-350.50	2.200	-450.50	-.019	-2.200	1.175
.800	5.016	-350.00	2.400	-450.00	.000	-2.400	1.200
.817	5.434	-350.50	2.600	-450.50	-.023	-2.600	1.225
.833	5.601	-351.50	2.680	-451.50	-.070	-2.679	1.250
.850	5.559	-352.50	2.660	-452.50	-.116	-2.657	1.275
.867	5.434	-353.00	2.600	-453.00	-.136	-2.596	1.300
.883	5.309	-354.00	2.540	-454.00	-.177	-2.534	1.325
.900	5.016	-355.00	2.400	-455.00	-.209	-2.391	1.350
.917	4.556	-355.50	2.180	-455.50	-.209	-2.170	1.375
.933	3.846	-356.00	1.840	-456.00	-.192	-1.830	1.400
.950	3.093	-356.00	1.480	-456.00	-.155	-1.472	1.425
.967	2.299	-356.40	1.100	-456.40	-.123	-1.093	1.450
.983	1.421	-356.50	.680	-456.50	-.077	-.676	1.475
.989	1.003	-356.50	.480	-456.50	-.054	-.477	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.004	13.013	-3.40	18.860	-3.40	18.827	-1.119	.006
.017	9.660	-4.80	14.000	-4.80	13.951	-1.171	.025
.033	8.252	-7.00	11.960	-7.00	11.871	-1.458	.050
.050	7.507	-9.50	10.880	-9.50	10.731	-1.796	.075
.067	6.707	-12.00	9.720	-12.00	9.508	-2.021	.100
.083	6.003	-15.00	8.700	-15.00	8.404	-2.252	.125
.100	5.147	-18.50	7.460	-18.50	7.074	-2.367	.150
.117	4.499	-23.50	6.520	-23.50	5.979	-2.600	.175
.133	3.505	-31.00	5.080	-31.00	4.354	-2.616	.200
.150	2.815	-42.00	4.080	-42.00	3.032	-2.730	.225
.167	2.125	-61.80	3.080	-61.80	1.455	-2.714	.250
.183	1.835	-90.50	2.660	-90.50	-.023	-2.660	.275
.200	2.056	-120.80	2.980	-120.80	-1.526	-2.560	.300
.217	2.650	-131.00	3.840	-131.00	-2.519	-2.898	.325
.233	3.409	-153.40	4.940	-153.40	-4.417	-2.212	.350
.250	4.002	-159.00	5.800	-159.00	-5.415	-2.079	.375
.267	4.747	-168.00	6.880	-168.00	-6.730	-1.430	.400
.283	5.299	-169.50	7.680	-169.50	-7.551	-1.400	.425
.300	5.755	-172.80	8.340	-172.80	-8.274	-1.045	.450
.317	5.948	-177.00	8.620	-177.00	-8.608	-.451	.475
.333	6.155	-177.80	8.920	-177.80	-8.913	-.342	.500
.350	6.210	-179.20	9.000	-179.20	-8.999	-.126	.525
.367	6.100	-181.50	8.840	-181.50	-8.837	.231	.550
.383	5.906	-183.20	8.560	-183.20	-8.547	.478	.575
.400	5.506	-185.80	7.980	-185.80	-7.939	.806	.600
.417	5.009	-188.20	7.260	-188.20	-7.186	1.035	.625
.433	4.306	-191.20	6.240	-191.20	-6.121	1.212	.650
.450	3.602	-194.60	5.220	-194.60	-5.051	1.316	.675
.467	2.857	-199.00	4.140	-199.00	-3.914	1.348	.700
.483	2.001	-214.00	2.900	-214.00	-2.404	1.622	.725
.500	1.297	-239.00	1.880	-239.00	-.968	1.611	.750
.517	1.145	-300.00	1.660	-300.00	.830	1.438	.775
.533	1.587	-327.00	2.300	-327.00	1.929	1.253	.800
.550	2.650	-339.00	3.840	-339.00	3.585	1.376	.825
.567	3.257	-343.00	4.720	-343.00	4.514	1.380	.850
.583	3.850	-347.40	5.580	-347.40	5.446	1.217	.875
.600	4.499	-350.00	6.520	-350.00	6.421	1.132	.900
.617	5.051	-352.50	7.320	-352.50	7.257	.955	.925
.633	5.506	-354.50	7.980	-354.50	7.943	.765	.950
.650	5.810	-356.20	8.420	-356.20	8.401	.558	.975
.667	6.003	-358.00	8.700	-358.00	8.695	.304	1.000
.683	6.058	-359.00	8.780	-359.00	8.779	.153	1.025
.700	6.003	-360.00	8.700	-360.00	8.700	-.000	1.050
.717	5.699	-361.00	8.260	-361.00	8.259	-.144	1.075
.733	5.299	-363.00	7.680	-363.00	7.669	-.402	1.100
.750	4.706	-364.00	6.820	-364.00	6.803	-.476	1.125
.767	4.209	-366.50	6.100	-366.50	6.061	-.691	1.150
.783	4.002	-370.00	5.800	-370.00	5.712	-1.007	1.175
.800	2.857	-372.00	4.140	-372.00	4.050	-.861	1.200
.817	1.904	-376.50	2.760	-376.50	2.646	-.784	1.225
.833	.856	-397.00	1.240	-397.00	.990	-.746	1.250
.850	.635	-478.00	.920	-478.00	-.432	-.812	1.275
.867	1.352	-524.00	1.960	-524.00	-1.884	-.540	1.300
.883	2.263	-527.50	3.280	-527.50	-3.202	-.710	1.325
.900	3.353	-533.00	4.860	-533.00	-4.884	-.592	1.350
.917	4.250	-535.00	6.160	-535.00	-6.137	-.537	1.375
.933	4.899	-537.50	7.100	-537.50	-7.093	-.310	1.400
.950	5.699	-539.50	8.260	-539.50	-8.260	-.072	1.425
.967	6.555	-540.50	9.500	-540.50	-9.500	.083	1.450
.983	7.659	-541.50	11.100	-541.50	-11.096	.291	1.475
.991	8.611	-542.00	12.480	-542.00	-12.472	.436	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0350 BETAL/BETAC = 1.004 H/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .2900

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	4.154	150.00	1.760	48.00	1.178	1.308	.003
.025	3.021	131.00	1.280	29.00	1.120	.621	.025
.050	2.502	102.00	1.060	.00	1.060	.000	.050
.075	2.549	74.50	1.080	-27.50	.958	-.499	.075
.100	3.210	55.50	1.360	-46.50	.936	-.987	.100
.125	3.965	42.80	1.680	-59.20	.860	-1.443	.125
.150	4.531	35.00	1.920	-67.00	.750	-1.767	.150
.175	5.239	29.80	2.220	-72.20	.679	-2.114	.175
.200	5.806	25.20	2.460	-76.80	.562	-2.395	.200
.225	6.183	22.60	2.620	-79.40	.482	-2.575	.225
.250	6.466	19.50	2.740	-82.50	.358	-2.717	.250
.275	6.514	17.50	2.760	-84.50	.265	-2.747	.275
.300	6.561	15.40	2.780	-86.60	.165	-2.775	.300
.325	6.325	12.60	2.680	-89.40	.028	-2.680	.325
.350	5.994	10.50	2.540	-91.50	-.066	-2.539	.350
.375	5.522	8.50	2.340	-93.50	-.143	-2.336	.375
.400	4.862	6.00	2.060	-96.00	-.215	-2.049	.400
.425	4.154	2.20	1.760	-99.80	-.300	-1.734	.425
.450	3.304	-2.20	1.400	-104.20	-.343	-1.357	.450
.475	2.454	-11.00	1.040	-113.00	-.406	-.957	.475
.500	1.652	-26.00	.700	-128.00	-.431	-.552	.500
.525	1.133	-60.00	.480	-162.00	-.457	-.148	.525
.550	1.369	-109.00	.580	-211.00	-.497	.299	.550
.575	1.982	-132.80	.840	-234.80	-.484	.686	.575
.600	2.832	-144.00	1.200	-246.00	-.488	1.096	.600
.625	3.567	-150.00	1.520	-252.00	-.470	1.446	.625
.650	4.295	-154.00	1.820	-256.00	-.440	1.766	.650
.675	5.003	-156.40	2.120	-258.40	-.426	2.077	.675
.700	5.570	-158.50	2.360	-260.50	-.390	2.328	.700
.725	5.994	-160.00	2.540	-262.00	-.354	2.515	.725
.750	6.183	-160.80	2.620	-262.80	-.328	2.599	.750
.775	6.183	-162.00	2.620	-264.00	-.274	2.606	.775
.800	6.042	-163.00	2.560	-265.00	-.223	2.550	.800
.825	5.900	-164.00	2.500	-266.00	-.174	2.494	.825
.850	5.617	-164.50	2.380	-266.50	-.145	2.376	.850
.875	5.003	-166.00	2.120	-268.00	-.074	2.119	.875
.900	4.248	-166.00	1.800	-268.00	-.063	1.799	.900
.925	3.398	-167.00	1.440	-269.00	-.025	1.440	.925
.950	2.596	-167.00	1.100	-269.00	-.019	1.100	.950
.975	1.558	-167.00	.660	-269.00	-.012	.660	.975
.984	1.086	-166.50	.460	-268.50	-.012	.460	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.006	14.554	-4.00	18.540	-4.00	18.495	-1.293	.006
.025	10.566	-5.00	13.460	-5.00	13.409	-1.173	.025
.050	9.326	-7.00	11.880	-7.00	11.791	-1.448	.050
.075	8.478	-9.00	10.800	-5.00	10.667	-1.689	.075
.100	7.630	-11.00	9.720	-11.00	9.541	-1.855	.100
.125	6.782	-13.20	8.640	-13.20	8.412	-1.973	.125
.150	5.479	-17.00	6.980	-17.00	6.675	-2.041	.150
.175	4.993	-21.50	6.360	-21.50	5.917	-2.331	.175
.200	3.988	-28.00	5.080	-28.00	4.485	-2.385	.200
.225	2.999	-37.50	3.820	-37.50	3.031	-2.325	.225
.250	2.229	-57.00	2.840	-57.00	1.547	-2.382	.250
.275	1.790	-88.50	2.280	-88.50	.060	-2.279	.275
.300	2.041	-122.50	2.600	-122.50	-1.397	-2.193	.300
.325	2.747	-145.00	3.500	-145.00	-2.867	-2.008	.325
.350	3.595	-156.40	4.580	-156.40	-4.197	-1.834	.350
.375	4.490	-163.60	5.720	-163.60	-5.487	-1.615	.375
.400	5.291	-168.00	6.740	-168.00	-6.593	-1.401	.400
.425	5.982	-168.80	7.620	-168.80	-7.475	-1.480	.425
.450	6.531	-174.00	8.320	-174.00	-8.274	-.870	.450
.475	6.924	-175.80	8.820	-175.80	-8.796	-.646	.475
.500	7.081	-177.50	9.020	-177.50	-9.011	-.393	.500
.525	7.222	-179.00	9.200	-175.00	-9.199	-.161	.525
.550	7.081	-180.50	9.020	-180.50	-9.020	.079	.550
.575	6.782	-181.60	8.640	-181.60	-8.637	.241	.575
.600	6.374	-183.40	8.120	-183.40	-8.106	.482	.600
.625	5.589	-184.20	7.120	-184.20	-7.101	.521	.625
.650	4.883	-187.00	6.220	-187.00	-6.174	.758	.650
.675	4.082	-189.00	5.200	-189.00	-5.136	.813	.675
.700	3.140	-193.00	4.000	-193.00	-3.897	.900	.700
.725	2.151	-200.00	2.740	-200.00	-2.575	.937	.725
.750	1.052	-221.00	1.340	-221.00	-1.011	.879	.750
.775	.769	-295.00	.980	-295.00	.414	.888	.775
.800	1.554	-336.00	1.980	-336.00	1.809	.805	.800
.825	2.669	-348.50	3.400	-348.50	3.332	.678	.825
.850	3.784	-353.00	4.820	-353.00	4.784	.587	.850
.875	4.883	-356.40	6.220	-356.40	6.208	.391	.875
.900	5.479	-358.20	6.980	-358.20	6.977	.219	.900
.925	6.484	-360.00	8.260	-360.00	8.260	-.000	.925
.950	7.473	-361.00	9.520	-361.00	9.519	-.166	.950
.975	8.666	-362.00	11.040	-362.00	11.033	-.385	.975
.987	9.718	-362.50	12.380	-362.50	12.368	-.540	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0438 BETAL/BETAC = 1.011 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA NORMALIZED DATA

Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	2.818	160.00	1.460	55.00	.837	1.196	.003
.050	1.621	135.00	.840	30.00	.727	.420	.025
.100	1.351	83.50	.700	-21.50	.651	-.257	.050
.150	1.969	47.40	1.020	-57.60	.547	-.861	.075
.200	2.895	33.00	1.500	-72.00	.464	-1.427	.100
.250	3.706	26.30	1.920	-78.70	.376	-1.883	.125
.300	4.516	22.00	2.340	-83.00	.285	-2.323	.150
.350	5.211	21.00	2.700	-84.00	.282	-2.685	.175
.400	5.829	17.00	3.020	-88.00	.105	-3.018	.200
.450	6.292	15.50	3.260	-89.50	.028	-3.260	.225
.500	6.408	14.50	3.320	-90.50	-.029	-3.320	.250
.550	6.523	13.20	3.380	-91.80	-.106	-3.378	.275
.600	6.330	12.60	3.280	-92.40	-.137	-3.277	.300
.650	6.176	12.00	3.200	-93.00	-.167	-3.196	.325
.700	5.829	11.60	3.020	-93.40	-.179	-3.015	.350
.750	5.327	11.00	2.760	-94.00	-.193	-2.753	.375
.800	4.516	10.90	2.340	-94.10	-.167	-2.334	.400
.850	3.628	10.50	1.880	-94.50	-.148	-1.874	.425
.900	2.702	10.50	1.400	-94.50	-.110	-1.396	.450
.950	1.660	10.60	.860	-94.40	-.066	-.857	.475
.968	1.158	11.20	.600	-93.80	-.040	-.599	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA NORMALIZED DATA

Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	13.473	-.50	20.260	-.50	20.259	-.177	.006
.050	9.975	-1.30	15.000	-1.30	14.996	-.340	.025
.100	8.632	-2.10	12.980	-2.10	12.971	-.476	.050
.150	7.780	-3.00	11.700	-3.00	11.684	-.612	.075
.200	7.182	-4.30	10.800	-4.30	10.770	-.810	.100
.250	6.091	-5.20	9.160	-5.20	9.122	-.830	.125
.300	5.293	-7.00	7.960	-7.00	7.901	-.970	.150
.350	4.389	-9.50	6.600	-9.50	6.509	-1.089	.175
.400	3.245	-13.10	4.880	-13.10	4.753	-1.106	.200
.450	2.141	-20.20	3.220	-20.20	3.022	-1.112	.225
.500	1.051	-42.10	1.580	-42.10	1.172	-1.059	.250
.550	.825	-119.50	1.240	-119.50	-.611	-1.079	.275
.600	1.769	-157.00	2.660	-157.00	-2.449	-1.039	.300
.650	2.926	-166.50	4.400	-166.50	-4.278	-1.027	.325
.700	4.096	-171.00	6.160	-171.00	-6.084	-.964	.350
.750	5.134	-174.00	7.720	-174.00	-7.678	-.807	.375
.800	5.785	-175.50	8.700	-175.50	-8.673	-.683	.400
.850	6.783	-176.50	10.200	-176.50	-10.181	-.623	.425
.900	7.687	-177.50	11.560	-177.50	-11.549	-.504	.450
.950	8.924	-178.50	13.420	-178.50	-13.415	-.351	.475
.974	10.081	-178.50	15.160	-178.50	-15.155	-.397	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0350 BETAL/BETAC = 1.004 H/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .2900

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA NORMALIZED DATA

Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.006	3.448	150.00	1.560	48.00	1.044	1.159	.003
.050	2.431	129.00	1.110	27.00	.990	.499	.025
.100	1.989	96.40	.900	-5.60	.896	-.088	.050
.150	2.294	65.00	1.040	-37.00	.831	-.626	.075
.200	2.917	46.50	1.320	-55.50	.748	-1.088	.100
.250	3.713	36.00	1.680	-66.00	.683	-1.535	.125
.300	4.287	30.00	1.940	-72.00	.599	-1.845	.150
.350	4.852	25.50	2.200	-76.50	.514	-2.139	.175
.400	5.461	22.00	2.480	-80.00	.431	-2.442	.200
.450	5.879	19.50	2.660	-81.50	.397	-2.637	.225
.500	6.100	17.80	2.760	-84.20	.279	-2.746	.250
.550	6.100	16.20	2.760	-85.80	.202	-2.753	.275
.600	6.011	15.20	2.720	-86.80	.152	-2.716	.300
.650	5.790	13.80	2.620	-88.20	.082	-2.619	.325
.700	5.481	12.60	2.480	-89.40	.026	-2.480	.350
.750	5.039	11.80	2.280	-90.20	-.008	-2.280	.375
.800	4.287	11.20	1.940	-90.80	-.027	-1.940	.400
.850	3.448	10.00	1.560	-92.00	-.054	-1.559	.425
.900	2.564	9.40	1.160	-92.60	-.053	-1.159	.450
.950	1.547	8.50	.700	-93.50	-.043	-.699	.475
.968	1.061	6.00	.480	-96.00	-.050	-.477	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA NORMALIZED DATA

Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.012	13.355	.10	15.620	.10	15.620	.027	.006
.050	9.918	-.50	11.600	-.50	11.600	-.101	.025
.100	8.464	-1.70	9.900	-1.70	9.896	-.294	.050
.150	7.575	-3.00	8.860	-3.00	8.848	-.464	.075
.200	6.823	-4.50	7.980	-4.50	7.955	-.626	.100
.250	5.985	-6.30	7.000	-6.30	6.958	-.768	.125
.300	5.130	-8.50	6.000	-8.50	5.934	-.887	.150
.350	4.138	-11.50	4.840	-11.50	4.743	-.965	.175
.400	3.334	-16.50	3.900	-16.50	3.739	-1.108	.200
.450	2.360	-25.00	2.760	-25.00	2.501	-1.166	.225
.500	1.368	-46.50	1.600	-46.50	1.101	-1.161	.250
.550	1.043	-100.50	1.220	-100.50	-.222	-1.200	.275
.600	1.624	-141.50	1.900	-141.50	-1.487	-1.183	.300
.650	2.668	-158.00	3.120	-158.00	-2.893	-1.169	.325
.700	3.779	-165.50	4.420	-165.50	-4.279	-1.107	.350
.750	4.788	-169.50	5.600	-169.50	-5.506	-1.021	.375
.800	5.433	-172.50	6.360	-172.50	-6.306	-.830	.400
.850	6.327	-174.00	7.400	-174.00	-7.359	-.774	.425
.900	7.319	-175.50	8.560	-175.50	-8.534	-.672	.450
.950	8.464	-176.90	9.900	-176.90	-9.886	-.535	.475
.974	9.559	-177.30	11.180	-177.30	-11.168	-.527	.487

TABLE 3.3

ADMITTANCE AND IMPEDANCE OF MONOPOLE ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .1289 BETAL/BETAO = 1.143 A/LAMDL = .0017

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0100

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
.093	.00	.35		
.180	.01	.54		
.359	.02	1.56		
.539	.11	2.42	18.74	-412.37
.718	.32	4.11	18.83	-241.84
.898	.93	5.96	25.56	-163.80
1.077	2.42	8.45	31.32	-109.37
1.257	6.78	12.51	33.49	-61.79
1.436	18.21	11.47	39.32	-24.76
1.616	20.50	-4.30	46.72	9.80
1.795	11.75	-8.48	55.96	40.39
1.975	6.76	-7.14	69.92	73.85
2.155	4.63	-5.57	88.25	106.17
2.334	3.49	-4.30	113.79	140.20
2.514	2.82	-3.32	148.62	174.97
2.693	2.37	-2.39	209.20	210.96
2.873	2.17	-1.55	305.14	217.96
3.052	2.11	-.79	415.67	155.63
3.232	2.13	-.06	469.11	13.21
3.411	2.30	.64	403.54	-112.29
3.591	2.63	1.36	300.01	-155.14
3.771	3.12	2.17	216.02	-150.24
3.950	3.98	2.87	165.30	-119.20
4.130	5.25	3.22	138.41	-84.89
4.309	6.82	3.03	122.46	-54.41
4.489	8.11	1.97	116.43	-28.28
4.668	8.53	.22	117.16	-3.02
4.848	7.92	-1.19	123.48	18.55
5.027	6.93	-1.92	134.01	37.13
5.207	5.87	-2.15	150.21	55.02
5.386	4.74	-1.88	182.29	72.30
5.566	4.48	-1.73	194.25	75.01
5.746	4.05	-1.39	220.89	75.81
5.925	3.83	-.89	247.72	57.56
6.105	3.70	-.37	267.59	26.76
6.284	3.72	.19	268.12	-13.69
6.464	3.86	.55	253.91	-36.18
6.643	4.11	.90	232.18	-50.89
6.823	4.47	1.18	209.14	-55.21
7.002	4.82	1.34	192.58	-53.54
7.182	5.42	1.32	174.17	-42.42
7.362	5.91	1.00	164.50	-27.83
7.541	6.23	.55	159.27	-14.06
7.721	6.33	-.05	157.97	1.25
7.900	6.15	-.55	161.31	14.43
8.080	5.76	-1.00	168.53	29.26
8.259	5.33	-1.04	180.74	35.27
8.439	4.95	-1.17	191.33	45.22
8.618	4.62	-1.12	204.44	49.56
8.798	4.36	-.81	221.71	41.19
8.977	4.26	-.68	228.91	36.54
9.157	4.17	-.47	236.80	26.69
9.337	4.26	-.19	234.28	10.45
9.516	4.35	.05	229.86	-2.64
9.696	4.49	.24	222.08	-11.87
9.875	4.73	.34	210.33	-15.12
10.055	4.91	.48	201.74	-19.72
10.234	4.93	.47	201.01	-19.16
10.414	4.90	.35	203.05	-14.50
10.593	4.92	.34	202.29	-13.98
10.773	4.92	.28	202.60	-11.53

ADMITTANCE AND IMPEDANCE OF MONOPOLE ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .0911 BETAL/BETAO = 1.052 A/LAMDL = .0016

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .0200

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
.066	.06	.10		
.165	.07	.26		
.330	.09	1.18		
.496	.15	2.14		
.661	.22	3.24	20.86	-307.23
.826	.65	5.50	21.19	-179.31
.991	1.25	6.84	25.85	-141.47
1.157	2.96	10.55	24.65	-87.87
1.322	10.24	15.96	28.48	-44.39
1.487	29.80	5.52	32.44	-6.01
1.652	16.43	-12.60	38.32	29.39
1.818	7.26	-10.24	46.12	64.87
1.983	4.22	-7.60	55.84	100.57
2.148	2.92	-5.80	69.25	137.55
2.313	2.12	-4.39	89.20	184.71
2.479	1.76	-3.50	114.68	228.05
2.644	1.54	-2.59	169.61	285.25
2.809	1.41	-1.88	255.32	340.43
2.974	1.33	-1.25	399.23	375.22
3.140	1.35	-.61	615.15	277.95
3.305	1.42	.03	703.91	-14.87
3.470	1.54	.77	519.48	-259.74
3.635	1.82	1.55	318.47	-271.22
3.801	2.33	2.56	194.45	-213.64
3.966	3.15	3.28	152.31	-158.60
4.131	4.57	4.25	117.34	-109.12
4.296	6.93	4.53	101.10	-66.09
4.462	9.50	3.16	94.78	-31.53
4.627	10.51	-.12	95.14	1.09
4.792	9.18	-2.81	99.60	30.49
4.957	7.20	-3.92	107.94	59.60
5.123	5.44	-3.90	121.42	87.05
5.288	4.27	-3.40	143.32	114.12
5.453	3.57	-2.88	169.68	136.89
5.618	3.01	-2.38	204.42	161.64
5.784	2.70	-1.82	254.66	171.66
5.949	2.53	-1.24	318.70	156.20
6.114	2.44	-.71	377.84	109.95
6.279	2.45	-.22	404.90	36.36
6.445	2.55	.35	384.91	-52.83
6.610	2.78	1.03	316.29	-117.19
6.775	3.14	1.33	270.03	-114.37
6.940	3.64	1.78	221.71	-108.42
7.106	4.63	1.94	183.73	-76.98
7.271	5.38	2.05	162.31	-61.85
7.436	6.32	1.47	150.11	-34.91
7.601	6.79	.52	142.27	-10.58
7.767	6.93	-.76	142.59	15.64
7.932	6.39	-1.68	142.49	36.32
8.097	5.72	-2.03	155.27	55.10
8.262	5.27	-1.96	166.70	62.00
8.428	4.51	-2.29	176.28	89.51
8.593	3.95	-1.87	206.81	97.91
8.758	3.65	-1.69	225.61	104.46
8.923	3.33	-1.41	254.65	107.82
9.089	3.05	-.81	306.27	81.34
9.254	2.54	-.63	370.89	91.99
9.419	2.95	-.55	327.60	61.08
9.584	3.11	-.32	318.17	32.74
9.750	3.54	-.02	282.48	1.60
9.915	3.67	.50	267.51	-36.45

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .0460 BETAL/BETAO = 1.018 A/LAMDL = .0015

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAC = .0500

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
.083	.01	.20		
.160	.01	.35		
.320	.03	.82		
.480	.03	1.39		
.640	.07	2.28		
.799	.16	3.51	12.96	-284.31
.959	.39	5.38	13.40	-184.90
1.119	1.12	8.49	15.27	-115.77
1.279	4.39	15.44	17.69	-59.51
1.439	36.31	18.51	21.16	-10.22
1.599	13.76	-19.30	24.49	34.35
1.759	4.45	-11.49	29.31	75.68
1.919	2.28	-7.79	34.61	118.24
2.079	1.47	-5.80	41.06	162.01
2.239	1.09	-4.54	50.00	208.26
2.398	.90	-3.62	64.68	260.16
2.558	.76	-2.89	85.11	323.64
2.718	.65	-2.30	113.79	402.63
2.878	.61	-1.70	187.00	521.14
3.038	.58	-1.22	317.84	668.57
3.198	.58	-.69	713.85	849.23
3.358	.62	-.07	1592.60	179.81
3.518	.69	.55	886.21	-706.40
3.678	.85	1.39	320.20	-523.62
3.838	1.14	2.47	154.04	-333.76
3.997	1.64	3.71	99.67	-225.48
4.157	2.73	5.50	72.41	-145.88
4.317	5.42	7.67	61.45	-86.96
4.477	12.19	8.13	56.78	-37.87
4.637	17.00	-2.56	57.52	8.66
4.797	10.21	-8.36	58.63	48.01
4.957	5.35	-7.38	64.39	88.82
5.117	3.24	-5.84	72.64	130.93
5.277	2.25	-4.51	88.57	177.54
5.437	1.72	-3.56	110.03	227.74
5.596	1.40	-2.75	147.02	288.79
5.756	1.23	-2.04	216.76	359.50
5.916	1.12	-1.54	308.88	424.71
6.076	1.06	-1.02	489.83	471.35
6.236	1.06	-.52	760.40	373.03
6.396	1.09	-.01	917.35	8.42
6.556	1.17	.52	713.72	-317.21
6.716	1.33	1.15	430.23	-372.00
6.876	1.59	1.78	279.12	-312.47
7.036	2.05	2.60	187.00	-237.17
7.195	2.92	3.51	140.07	-168.37
7.355	4.41	4.33	115.45	-113.36
7.515	7.17	4.34	102.07	-61.78
7.675	10.47	1.94	92.34	-17.11
7.835	10.39	-2.74	88.50	22.90
7.995	7.66	-5.23	89.04	60.79
8.155	5.07	-5.39	92.59	98.43
8.315	3.58	-4.76	100.92	134.18
8.475	2.67	-4.00	115.44	172.94
8.635	2.12	-3.27	139.59	215.31
8.794	1.80	-2.63	177.22	258.94
8.954	1.61	-2.09	231.32	300.28
9.114	1.48	-1.61	309.46	336.64
9.274	1.43	-1.13	430.49	340.18
9.434	1.45	-.62	583.06	249.31
9.594	1.50	-.11	663.10	48.63

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .0280 BETAL/BETAO = 1.016 A/LAMDL = .0015

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAC = .1000

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
.083	.01	.35		
.160	.01	.42		
.319	.03	.94		
.479	.03	1.71		
.638	.07	2.70	9.60	-370.12
.798	.14	3.77	9.84	-264.89
.958	.32	5.62	10.10	-177.36
1.117	.94	8.89	11.76	-111.24
1.277	4.64	16.94	15.59	-54.58
1.436	49.65	7.84	19.69	-2.99
1.596	8.90	-16.47	25.39	46.99
1.756	3.17	-9.34	32.58	96.01
1.915	1.72	-6.20	41.55	149.76
2.075	1.12	-4.56	43.32	191.83
2.234	.92	-3.51	69.87	266.59
2.394	.76	-2.71	95.94	342.10
2.554	.65	-2.05	140.54	443.24
2.713	.57	-1.56	206.63	565.52
2.873	.53	-1.02	401.12	771.97
3.032	.50	-.58	852.66	989.09
3.192	.53	-.16	1729.20	522.02
3.352	.54	.44	1112.94	-906.84
3.511	.59	1.05	406.73	-723.84
3.671	.65	1.76	184.65	-499.59
3.830	.80	2.77	96.24	-333.22
3.990	1.15	4.00	66.39	-230.91
4.150	1.45	5.98	47.21	-152.62
4.309	3.92	9.03	40.45	-93.18
4.469	12.38	13.26	37.62	-40.29
4.628	21.74	-4.62	44.01	9.35
4.788	6.09	-10.99	43.44	59.01
4.948	3.62	-7.53	51.86	107.87
5.107	2.12	-5.32	64.64	162.21
5.267	1.47	-3.90	84.62	224.51
5.426	1.15	-2.86	121.03	300.99
5.586	.97	-2.05	168.59	398.57
5.746	.85	-1.48	291.81	508.08
5.905	.76	-.93	526.86	644.71
6.065	.72	-.53	900.79	663.08
6.224	.70	-.04	1423.92	81.37
6.384	.67	.49	972.42	-711.18
6.544	.71	.98	484.81	-669.17
6.703	.76	1.63	238.88	-499.19
6.863	.93	2.26	155.71	-378.40
7.022	1.19	3.21	101.53	-273.89
7.182	1.67	4.28	79.12	-208.77
7.342	2.76	5.85	65.97	-139.82
7.501	5.67	7.96	59.37	-83.34
7.661	13.48	7.58	56.36	-31.69
7.820	15.92	-4.96	57.26	17.86
7.980	7.68	-8.19	60.92	64.97
8.140	3.91	-6.52	67.65	112.81
8.299	2.44	-4.97	79.60	162.13
8.459	1.73	-3.84	97.53	216.48
8.618	1.35	-2.93	129.72	281.53
8.778	1.15	-2.21	185.29	356.07
8.938	1.03	-1.63	277.05	438.43
9.097	.75	-1.08	459.18	522.02
9.257	.92	-.61	755.03	500.62
9.416	.91	-.15	1069.83	176.35
9.576	.93	.35	941.87	-354.47

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .0310 BETAL/BETAO = 1.016 A/LAMDL = .0015

FREQUENCY = 300.00MHZ BE = .067 D/LAMDAO = .2500

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
.083	.01	.38		
.160	.01	.63		
.319	.03	1.36		
.479	.05	2.23		
.638	.08	3.11	8.27	-321.33
.798	.21	4.28	11.44	-233.08
.958	.63	6.19	16.27	-159.89
1.117	2.03	9.33	22.27	-102.34
1.277	6.77	14.62	30.17	-50.30
1.436	23.90	.53	41.82	-.93
1.596	10.13	-8.71	56.76	48.80
1.756	4.95	-6.26	77.72	98.29
1.915	3.04	-4.44	104.99	153.34
2.075	2.22	-3.26	142.71	209.57
2.234	1.75	-2.40	198.36	272.03
2.394	1.50	-1.72	288.00	330.24
2.554	1.33	-1.15	430.23	372.00
2.713	1.22	-.67	629.74	345.84
2.873	1.14	-.20	851.00	149.30
3.032	1.09	.15	900.38	-123.91
3.192	1.02	.44	826.58	-356.56
3.352	1.04	.96	519.17	-479.23
3.511	1.06	1.53	305.96	-441.62
3.671	1.13	2.11	197.24	-368.30
3.830	1.28	3.13	111.93	-273.71
3.990	1.64	4.23	79.68	-205.51
4.150	2.63	6.09	59.77	-138.39
4.309	5.16	8.83	49.33	-84.42
4.469	14.18	9.47	48.77	-32.57
4.628	16.36	-5.55	54.82	18.60
4.738	7.13	-7.41	67.43	70.07
4.948	3.82	-5.33	88.83	123.95
5.107	2.45	-3.76	121.65	186.69
5.267	1.92	-2.62	181.98	248.32
5.426	1.59	-1.80	275.65	312.06
5.586	1.39	-1.19	415.15	355.41
5.746	1.28	-.64	625.00	312.50
5.905	1.19	-.24	807.49	162.86
6.065	1.14	.12	867.58	-91.32
6.224	1.10	.50	753.43	-342.47
6.384	1.15	.96	512.46	-427.79
6.544	1.16	1.41	347.96	-422.95
6.703	1.20	1.93	232.34	-373.68
6.863	1.32	2.57	158.14	-307.88
7.022	1.52	3.46	106.43	-242.26
7.182	1.97	4.53	80.73	-185.64
7.342	3.01	6.06	65.74	-132.36
7.501	5.78	8.02	59.75	-80.14
7.661	14.32	6.70	57.29	-26.81
7.820	13.98	-5.71	61.30	25.04
7.980	6.46	-6.94	71.86	77.20
8.140	3.62	-5.20	90.17	129.53
8.299	2.47	-3.80	120.25	185.00
8.459	1.94	-2.85	163.22	239.78
8.618	1.62	-2.09	231.68	298.89
8.778	1.45	-1.44	347.21	344.82
8.938	1.36	-.95	494.17	345.19
9.097	1.29	-.51	670.41	265.05
9.257	1.26	-.12	786.52	74.91
9.416	1.23	.30	767.36	-187.16
9.576	1.23	.74	596.94	-359.14

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0660 BETAL/BETAO = 1.109 A/LAMDL = .0017

FREQUENCY = 300.00MHZ BE = 2.885 D/LAMDAO = .0100

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
.091	.00	.16		
.174	.01	.38		
.348	.03	1.48		
.523	.07	2.70	9.60	-370.12
.697	.16	4.03	9.84	-247.75
.871	.42	5.97	11.73	-166.68
1.045	1.17	9.16	13.72	-107.42
1.219	3.46	14.94	16.21	-62.75
1.394	21.72	25.12	19.70	-22.78
1.568	30.08	-19.04	23.73	15.02
1.742	11.11	-16.89	27.18	41.33
1.916	4.69	-10.93	34.11	76.23
2.090	3.07	-7.84	43.31	110.59
2.265	2.12	-5.96	52.98	148.54
2.439	1.64	-4.50	71.49	196.17
2.613	1.36	-3.34	104.57	256.82
2.787	1.21	-2.43	164.20	329.76
2.961	1.14	-1.57	302.83	417.05
3.136	1.15	-.73	619.81	393.45
3.310	1.19	.05	838.86	-35.25
3.484	1.39	.61	603.25	-264.73
3.658	1.70	2.06	238.31	-288.77
3.832	2.91	3.50	135.31	-188.68
4.007	3.75	4.89	98.75	-128.77
4.181	6.11	6.33	78.94	-81.78
4.355	10.33	6.63	68.56	-44.00
4.529	15.00	2.85	64.34	-12.23
4.703	14.47	-3.59	65.10	16.15
4.878	9.84	-6.43	71.22	46.54
5.052	6.67	-6.18	80.67	74.74
5.226	4.60	-5.28	94.27	103.70
5.400	3.74	-4.35	113.64	132.18
5.574	3.09	-3.42	145.45	160.98
5.749	2.67	-2.65	188.67	187.26
5.923	2.43	-1.89	256.41	199.43
6.097	2.38	-1.04	352.80	154.17
6.271	2.30	-.42	420.75	76.83
6.445	2.46	.36	397.98	-58.24
6.620	2.56	1.05	325.26	-128.39
6.794	3.20	1.95	227.88	-138.86
6.968	3.84	2.61	178.13	-121.07
7.142	4.90	3.10	145.75	-92.21
7.316	6.02	3.37	119.97	-61.07
7.491	6.71	2.56	111.01	-34.61
7.665	9.76	.98	101.44	-10.19
7.839	9.95	-1.44	98.44	14.25
8.013	8.41	-3.48	101.52	42.01
8.187	6.65	-4.17	106.51	64.84
8.362	5.50	-4.11	116.06	85.18
8.536	4.43	-3.48	139.59	109.66
8.710	3.64	-3.12	156.86	127.45
8.884	3.47	-2.53	168.16	137.15
9.058	3.16	-1.94	229.83	141.10
9.233	3.14	-1.40	271.39	124.58
9.407	3.16	-.75	308.28	75.56
9.581	3.42	-.04	301.16	3.63
9.755	3.40	.43	287.49	-36.61
9.929	3.75	.92	251.53	-61.71
10.104	4.34	1.41	208.42	-67.71
10.278	5.18	1.73	176.39	-60.07
10.452	5.16	1.59	153.95	-40.26

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0407   BETAL/BETAO = 1.047   A/LAMDL = .0016

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAO = .0200

BETAL*H	ADMITTANCE (MILLIMHOS) G	ADMITTANCE (MILLIMHOS) B	IMPEDANCE (OHMS) R	IMPEDANCE (OHMS) X
.086	.03	1.21		
.164	.05	1.50		
.329	.05	2.42		
.493	.07	3.51	5.68	-284.79
.658	.13	4.78	5.69	-209.05
.822	.25	6.42	6.06	-155.53
.987	.57	8.80	7.33	-113.16
1.151	1.53	13.01	8.92	-75.82
1.316	6.34	22.80	11.32	-40.71
1.480	56.16	26.76	14.51	-6.91
1.644	16.67	-24.88	18.59	27.74
1.809	5.11	-13.48	24.59	64.86
1.973	2.58	-8.42	33.27	108.57
2.138	1.68	-5.83	45.64	158.38
2.302	1.26	-4.18	66.11	219.31
2.467	1.03	-2.96	104.86	301.35
2.631	.90	-1.93	198.46	425.59
2.796	.82	-1.03	473.09	594.24
2.960	.79	-.24	1158.87	352.06
3.125	.81	.55	844.98	-573.75
3.289	.85	1.34	337.56	-532.15
3.453	.94	2.26	156.90	-377.22
3.618	1.09	3.22	94.32	-278.63
3.782	1.38	4.37	65.71	-208.08
3.947	1.91	5.79	51.38	-155.76
4.111	3.12	7.80	44.21	-110.52
4.276	6.07	10.62	40.57	-70.58
4.440	13.61	12.25	40.59	-36.54
4.605	23.12	2.00	42.93	-3.71
4.769	14.45	-9.11	48.93	30.02
4.933	7.40	-8.50	58.26	66.92
5.098	4.56	-6.30	75.39	104.16
5.262	3.03	-4.74	95.74	149.77
5.427	2.29	-3.36	138.51	203.22
5.591	1.85	-2.28	214.59	264.47
5.756	1.62	-1.36	362.09	303.98
5.920	1.49	-.47	610.41	192.54
6.085	1.44	.22	678.61	-103.68
6.249	1.43	.90	500.89	-315.25
6.414	1.53	1.70	292.49	-324.99
6.578	1.68	2.43	192.50	-278.44
6.742	1.95	3.16	141.43	-229.18
6.907	2.46	4.08	108.38	-179.75
7.071	3.35	5.07	90.72	-137.30
7.236	4.94	6.30	76.68	-99.82
7.400	7.80	7.22	69.16	-65.70
7.565	11.61	5.89	68.50	-34.75
7.729	14.15	.85	70.42	-4.23
7.894	11.51	-4.17	75.29	26.58
8.058	8.01	-5.51	84.74	58.29
8.222	5.45	-5.01	99.45	91.42
8.387	4.00	-4.12	121.31	124.95
8.551	3.10	-3.18	157.18	161.24
8.716	2.49	-2.31	215.84	200.24
8.880	2.32	-1.49	310.55	208.44
9.045	2.00	-.77	435.45	167.65
9.209	1.32	-.10	519.42	27.05
9.374	1.92	.57	478.65	-142.10
9.538	2.03	1.20	365.05	-215.75
9.703	2.21	1.86	264.87	-222.92
9.867	2.59	2.62	190.83	-193.04

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0220   BETAL/BETAO = 1.025   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAO = .0500

BETAL*H	ADMITTANCE (MILLIMHOS) G	ADMITTANCE (MILLIMHOS) B	IMPEDANCE (OHMS) R	IMPEDANCE (OHMS) X
.064	.02	1.45		
.161	.03	1.71		
.322	.05	2.62		
.483	.07	3.51		
.644	.10	4.66	4.60	-214.49
.805	.16	6.08	4.33	-164.36
.966	.32	8.11	4.86	-123.11
1.127	.83	11.74	5.99	-84.76
1.288	3.34	20.41	7.81	-47.72
1.449	55.62	46.01	10.67	-8.83
1.610	11.34	-25.59	14.47	32.66
1.771	3.10	-11.87	20.60	78.87
1.932	1.58	-7.16	29.39	133.18
2.093	1.01	-4.73	43.18	202.20
2.254	.76	-3.26	67.83	290.94
2.415	.61	-2.12	125.35	435.63
2.576	.54	-1.25	291.25	674.18
2.737	.47	-.52	956.65	1058.42
2.898	.44	.06	2231.24	-304.26
3.059	.43	.60	789.14	-1101.12
3.220	.47	1.20	282.98	-722.50
3.381	.51	2.05	114.28	-459.37
3.542	.56	2.97	61.31	-325.14
3.703	.72	3.89	46.00	-248.55
3.864	.90	5.01	34.74	-193.36
4.025	1.30	6.62	28.56	-145.45
4.186	2.19	9.13	24.84	-103.57
4.347	4.93	13.53	23.99	-65.06
4.508	19.12	19.75	25.30	-26.14
4.669	23.22	-12.89	29.32	13.39
4.830	7.90	-12.62	35.64	56.93
4.991	3.45	-7.91	46.33	106.22
5.152	1.98	-5.23	63.31	167.24
5.313	1.39	-3.50	98.01	246.79
5.474	1.09	-2.27	171.90	357.99
5.635	.95	-1.25	385.40	507.10
5.796	.83	-.54	846.51	550.74
5.957	.77	.11	1272.73	-181.82
6.118	.76	.71	702.60	-656.38
6.279	.79	1.25	352.94	-588.24
6.440	.80	1.92	184.91	-443.79
6.601	.86	2.54	119.59	-353.21
6.762	.97	3.22	85.77	-284.72
6.923	1.19	4.13	64.42	-223.57
7.084	1.62	5.58	47.98	-165.28
7.245	2.42	7.08	43.23	-126.47
7.406	4.82	9.65	39.81	-84.98
7.567	10.69	12.29	40.29	-46.32
7.728	22.74	4.12	42.58	-7.71
7.889	14.21	-9.88	47.44	32.98
8.050	6.32	-8.53	56.08	75.69
8.211	3.45	-6.09	70.42	124.31
8.372	2.23	-4.34	93.66	182.25
8.533	1.63	-3.09	133.55	253.17
8.694	1.31	-2.15	206.67	339.19
8.855	1.14	-1.26	394.85	436.41
9.016	1.04	-.58	733.43	409.03
9.177	.98	.07	1015.23	-72.52
9.338	.96	.69	666.84	-493.67
9.499	.98	1.24	392.31	-496.40
9.660	1.04	1.51	219.89	-403.89

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0190   BETAL/BETAO = 1.023   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAC = .1000

BETAL*H	ADMITTANCE(MILLIMHOS) G	B	IMPEDANCE(OHMS) R	X
.084	.00	1.33	.00	-751.88
.161	.00	1.56	.00	-641.03
.321	.00	2.42	.00	-413.22
.482	.02	3.33	1.80	-300.29
.643	.05	4.29	2.72	-233.07
.804	.09	5.62	2.85	-177.89
.964	.26	7.50	4.62	-133.17
1.125	.93	11.18	7.39	-88.83
1.286	4.79	20.75	10.55	-45.75
1.447	54.01	40.50	11.85	-8.89
1.607	7.92	-16.87	22.80	48.57
1.768	2.68	-8.84	33.32	102.27
1.929	1.53	-5.30	50.28	174.17
2.090	1.03	-3.48	78.20	264.21
2.250	.80	-2.28	137.02	390.52
2.411	.64	-1.39	273.31	593.59
2.572	.56	-.72	673.08	865.38
2.733	.49	-.19	1774.08	687.91
2.893	.45	.35	1384.62	-1076.92
3.054	.43	.87	456.57	-923.76
3.215	.40	1.32	210.26	-693.86
3.376	.39	2.05	89.56	-470.77
3.536	.42	2.83	51.31	-345.74
3.697	.45	3.64	33.45	-270.59
3.858	.58	4.65	26.41	-211.76
4.019	.82	6.07	21.86	-161.75
4.179	1.46	8.39	20.13	-115.69
4.340	3.44	12.77	19.67	-73.01
4.501	15.40	21.87	21.52	-30.57
4.662	29.41	-16.27	26.03	14.40
4.822	6.13	-12.06	33.49	65.89
4.983	2.57	-7.01	46.10	125.75
5.144	1.43	-4.41	66.53	205.18
5.305	1.01	-2.81	113.28	315.16
5.465	.79	-1.64	238.40	494.92
5.626	.62	-.85	560.12	767.91
5.787	.54	-.20	1628.47	603.14
5.948	.48	.41	1204.52	-1028.86
6.108	.45	.96	400.32	-854.02
6.269	.43	1.37	214.21	-672.51
6.430	.40	1.85	111.65	-516.40
6.591	.48	2.42	78.86	-397.58
6.751	.52	2.97	57.20	-326.69
6.912	.61	3.82	40.76	-255.27
7.073	.82	4.84	34.03	-200.65
7.234	1.25	6.40	29.40	-150.51
7.394	2.27	8.75	27.78	-107.08
7.555	5.81	12.93	28.91	-64.35
7.716	22.50	14.23	31.75	-20.08
7.877	17.43	-13.01	36.84	27.50
8.037	5.67	-9.80	44.23	76.45
8.198	2.69	-6.20	58.89	135.74
8.359	1.59	-4.04	84.35	214.33
8.520	1.13	-2.71	131.08	314.35
8.680	.89	-1.72	237.30	458.61
8.841	.72	-.96	500.00	666.67
9.002	.63	-.30	1293.90	616.14
9.163	.58	.31	1341.04	-716.76
9.323	.55	.78	603.80	-856.30
9.484	.55	1.29	279.67	-655.96
9.645	.56	1.85	149.89	-495.17

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0340   BETAL/BETAO = 1.016   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAC = .2500

BETAL*H	ADMITTANCE(MILLIMHOS) G	B	IMPEDANCE(OHMS) R	X
.063	.00	1.62	.00	-617.28
.160	.00	1.85	.00	-540.54
.319	.00	2.56	.00	-390.62
.479	.02	3.59	1.55	-278.54
.638	.07	4.54	3.40	-220.21
.798	.23	5.85	6.71	-170.68
.958	.88	7.70	11.38	-128.87
1.117	2.27	10.99	18.03	-87.27
1.277	9.76	15.93	27.42	-46.66
1.436	23.93	1.50	41.63	-2.61
1.596	10.46	-7.63	62.40	45.52
1.756	4.94	-5.33	93.54	100.92
1.915	3.06	-3.41	145.77	162.45
2.075	2.19	-2.13	234.65	228.22
2.234	1.70	-1.23	386.11	279.34
2.394	1.57	-.54	569.56	195.90
2.554	1.25	.11	793.85	-69.86
2.713	1.14	.62	676.96	-368.17
2.873	1.06	.96	518.29	-469.39
3.032	1.04	1.50	312.16	-450.23
3.192	.99	1.91	213.91	-412.65
3.352	.96	2.54	130.20	-344.49
3.511	1.01	3.22	88.69	-282.74
3.671	1.15	3.88	64.99	-240.15
3.830	1.41	4.87	54.85	-189.46
3.990	1.65	6.15	40.70	-151.68
4.150	2.73	8.33	35.53	-108.40
4.309	5.74	11.07	37.64	-70.14
4.469	16.26	10.48	43.45	-28.01
4.628	15.76	-5.14	56.48	18.03
4.788	7.21	-6.23	79.41	68.61
4.948	4.04	-4.19	119.25	123.68
5.107	2.72	-2.67	187.23	183.79
5.267	2.10	-1.58	304.07	228.77
5.426	1.75	-.73	466.73	203.04
5.586	1.54	-.05	648.67	21.06
5.746	1.43	.54	612.03	-231.11
5.905	1.30	.97	454.13	-368.70
6.065	1.22	1.49	328.97	-401.78
6.224	1.20	1.90	237.62	-376.24
6.384	1.25	2.47	163.11	-322.31
6.544	1.26	2.94	123.15	-287.36
6.703	1.31	3.47	95.22	-252.24
6.863	1.42	4.12	74.77	-216.95
7.022	1.64	5.05	58.17	-179.13
7.182	2.15	6.24	49.36	-143.25
7.342	3.41	8.08	44.33	-105.08
7.501	7.13	10.54	44.03	-65.05
7.661	16.84	7.47	49.62	-22.01
7.820	14.70	-5.31	61.78	23.10
7.980	6.62	-5.48	89.64	74.20
8.140	3.94	-3.92	127.55	126.90
8.299	2.69	-2.47	201.69	185.20
8.459	2.14	-1.45	320.26	217.00
8.618	1.81	-.67	465.91	179.87
8.778	1.61	-.03	620.90	11.57
8.938	1.53	.52	585.92	-199.13
9.097	1.45	.99	470.38	-321.16
9.257	1.40	1.45	344.62	-356.92
9.416	1.39	1.89	252.53	-343.37
9.576	1.39	2.37	164.13	-313.95

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0960 BETAL/BETAO = 1.106 A/LAMDL = .0017

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAC = .0200

BETAL*H	ADMITTANCE(MILLIMHOS) G	B	IMPEDANCE(OHMS) R	X
.090	.04	.66		
.174	.06	.82		
.347	.11	1.71		
.521	.16	2.56		
.695	.21	3.77	14.73	-264.43
.869	.47	5.38	16.12	-184.47
1.042	1.19	7.58	20.21	-128.75
1.216	3.42	11.20	24.94	-81.67
1.390	12.76	16.07	30.36	-37.93
1.564	26.43	-1.04	37.22	1.44
1.737	11.98	10.53	47.09	-41.39
1.911	5.94	-8.03	59.54	80.49
2.085	4.38	-5.67	87.20	101.32
2.258	2.92	-4.35	106.38	158.48
2.432	2.07	-3.26	138.81	218.61
2.606	1.78	-2.30	210.44	271.92
2.780	1.60	-1.56	320.41	312.40
2.953	1.50	-.86	501.74	287.66
3.127	1.47	-.20	667.91	90.87
3.301	1.46	.12	680.34	-55.92
3.474	1.58	.89	480.46	-270.64
3.648	1.77	1.32	363.05	-270.75
3.822	2.26	2.57	192.96	-219.42
3.996	2.74	3.58	137.00	-166.82
4.169	3.64	3.98	125.55	-130.12
4.343	5.60	4.53	107.07	-83.64
4.517	7.48	3.84	105.81	-54.32
4.691	9.72	1.60	100.17	-16.45
4.864	9.30	-1.21	105.74	13.76
5.038	7.36	-2.54	121.41	41.90
5.212	5.93	-2.94	135.36	67.11
5.385	4.51	-2.61	166.10	96.12
5.559	3.58	-2.42	191.72	129.60
5.733	3.09	-1.52	260.57	128.18
5.907	2.73	-1.08	316.73	125.30
6.080	2.57	-.37	381.20	54.88
6.254	2.46	-.02	406.48	3.30
6.428	2.52	.61	374.86	-90.74
6.602	2.64	1.05	327.05	-130.08
6.775	2.84	1.48	276.91	-144.31
6.949	3.26	2.00	222.87	-136.73
7.123	3.81	2.47	184.80	-119.80
7.296	4.51	2.47	170.57	-93.42
7.470	5.40	2.25	157.79	-65.75
7.644	6.17	1.87	148.44	-44.99
7.818	6.59	.92	148.84	-20.78
7.991	6.51	-.19	153.48	4.48
8.165	5.96	-1.13	161.96	30.71
8.339	5.28	-1.58	173.83	52.02
8.513	4.57	-1.66	193.31	70.22
8.686	3.78	-1.55	226.47	92.87
8.860	3.49	-1.10	260.64	82.15
9.034	3.35	-.89	278.83	74.08
9.207	3.14	-.49	310.90	48.52
9.381	3.03	.03	330.00	-3.27
9.555	2.91	.38	337.88	-44.12
9.729	2.91	.54	332.21	-61.65
9.902	3.28	.62	294.36	-55.64
10.076	3.53	.88	266.71	-66.45
10.250	4.11	.90	232.18	-50.84
10.423	4.34	1.47	206.70	-70.01

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0621 BETAL/BETAO = 1.031 A/LAMDL = .0015

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAC = .0500

BETAL*H	ADMITTANCE(MILLIMHOS) G	B	IMPEDANCE(OHMS) R	X
.084	.02	1.42		
.162	.03	1.71		
.324	.07	2.56		
.486	.09	3.25		
.648	.11	4.16	6.35	-240.22
.810	.57	6.08	15.29	-163.04
.972	.60	7.60	10.32	-130.76
1.134	1.49	9.34	16.66	-104.41
1.296	6.67	17.57	18.83	-49.75
1.458	30.47	15.10	26.14	-12.75
1.619	16.57	-13.73	35.78	29.65
1.781	6.17	-9.28	49.66	74.73
1.943	3.74	-6.07	63.58	126.46
2.105	2.35	-4.05	107.18	184.72
2.267	1.73	-2.92	150.18	253.49
2.429	1.45	-1.89	255.52	333.06
2.591	1.26	-1.17	426.18	395.74
2.753	1.12	-.49	749.42	327.87
2.915	1.03	.16	948.00	-147.26
3.077	1.01	.78	620.20	-478.97
3.239	.96	1.09	455.04	-516.66
3.401	1.01	1.68	262.85	-437.22
3.563	1.15	2.39	163.48	-339.75
3.725	1.37	3.33	105.66	-256.83
3.887	1.74	4.35	79.27	-198.18
4.049	2.48	5.52	67.72	-150.73
4.211	3.96	6.97	61.62	-108.46
4.373	6.67	8.11	60.81	-71.79
4.535	11.74	6.22	66.19	-34.77
4.697	13.64	-.07	73.31	.38
4.858	10.52	-3.37	86.21	27.62
5.020	6.77	-4.52	104.96	75.66
5.182	4.09	-3.62	136.15	114.85
5.344	3.14	-2.65	166.00	156.97
5.506	2.47	-1.83	281.35	193.65
5.668	2.05	-1.08	381.83	201.16
5.830	1.85	-.41	515.23	114.15
5.992	1.70	.25	575.78	-64.67
6.154	1.64	.73	508.92	-226.53
6.316	1.63	1.34	366.09	-300.95
6.478	1.70	2.06	238.31	-288.77
6.640	1.80	2.34	206.53	-268.48
6.802	2.06	2.87	165.06	-229.96
6.964	2.47	3.64	127.65	-188.11
7.126	3.10	4.09	117.70	-155.29
7.288	4.01	4.35	114.55	-124.28
7.450	5.11	4.54	109.37	-97.17
7.612	6.51	4.10	109.98	-69.27
7.774	7.56	1.69	125.68	-28.02
7.936	8.14	.42	122.52	-6.32
8.097	7.23	-1.60	131.86	29.18
8.259	5.39	-2.22	158.62	65.33
8.421	4.33	-1.86	204.41	73.65
8.583	3.47	-1.63	236.09	110.90
8.745	2.74	-1.26	301.26	138.53
8.907	2.56	-.70	363.45	99.38
9.069	2.33	-.16	427.17	29.33
9.231	1.95	.54	476.30	-131.90
9.393	1.96	.38	451.72	-95.33
9.555	2.25	1.26	338.34	-189.47
9.717	2.36	1.69	279.33	-198.35

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0438   BETAL/BETAO = 1.011   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAO = .1000

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
.083	.12	1.42		
.159	.13	1.71		
.318	.18	2.56		
.476	.19	3.38		
.635	.21	4.28	11.44	-233.08
.794	.45	5.38	15.44	-184.58
.953	.58	6.53	13.50	-151.94
1.112	1.47	10.42	13.27	-94.10
1.270	5.55	17.19	17.01	-52.68
1.429	35.38	15.19	23.87	-10.25
1.588	13.43	-14.24	35.05	37.17
1.747	4.82	-6.65	49.16	88.22
1.906	2.36	-5.56	68.33	148.40
2.064	1.80	-3.62	110.13	221.48
2.223	1.37	-2.41	178.27	313.60
2.382	1.14	-1.57	302.83	417.05
2.541	1.01	-.98	509.97	494.82
2.700	.88	-.31	1010.91	356.12
2.858	.83	.17	1156.31	-236.83
3.017	.77	.70	711.05	-646.41
3.176	.82	1.40	311.50	-531.83
3.335	.83	1.84	203.71	-451.55
3.494	.91	2.60	119.92	-342.64
3.652	[illegible]	3.36	81.37	-273.40
3.811	[illegible]	4.38	58.18	-212.37
3.970	1.69	5.57	49.86	-164.40
4.129	2.49	7.10	43.99	-125.42
4.288	4.76	9.35	43.24	-84.94
4.446	10.79	11.56	43.15	-46.23
4.605	19.26	2.69	50.93	-7.11
4.764	12.01	-6.56	64.13	35.03
4.923	5.91	-5.84	85.61	84.60
5.082	3.52	-4.14	119.20	140.20
5.240	2.42	-2.70	184.08	205.38
5.399	[illegible]	-1.60	308.48	262.54
5.558	[illegible]	-.88	481.45	266.46
5.717	1.40	-.19	701.37	95.19
5.876	1.23	.30	767.36	-187.16
6.034	1.16	.77	598.40	-397.21
6.193	1.15	1.38	356.38	-427.66
6.352	1.09	1.97	215.03	-388.64
6.511	1.13	2.39	161.64	-341.97
6.670	1.22	3.08	111.16	-280.64
6.828	1.40	3.73	88.20	-234.99
6.987	1.76	4.60	72.55	-195.63
7.146	2.27	5.65	61.23	-152.39
7.305	[illegible]	6.59	60.97	-121.03
7.464	5.67	7.64	62.64	-84.40
7.622	[illegible]	6.94	67.30	-46.34
7.781	[illegible]	1.67	75.23	-9.60
7.940	9.70	-3.69	90.06	34.26
8.099	[illegible]	-4.07	114.07	77.25
8.258	3.85	-3.33	148.58	128.51
8.416	2.80	-2.36	208.81	175.99
8.575	2.23	-1.83	304.95	209.19
8.734	1.86	-.91	433.80	212.24
8.893	1.68	-.16	583.89	56.18
9.052	[illegible]	.12	662.43	-52.99
9.210	1.43	.90	500.89	-315.28
9.369	1.47	1.35	369.03	-338.91
9.528	1.52	1.93	251.85	-319.79

ADMITTANCE AND IMPEDANCE OF MONOPOLE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0350   BETAL/BETAO = 1.004   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAO = .2900

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
[illegible]	[illegible]	.66		
.158	[illegible]	.82		
.315	[illegible]	1.48		
.473	[illegible]	2.00		
.631	[illegible]	2.84	12.36	-351.62
.789	.21	3.90	13.77	-255.67
.946	[illegible]	5.02	21.57	-196.84
[illegible]	[illegible]	8.24	34.83	-110.37
1.262	[illegible]	11.85	36.90	-62.65
[illegible]	[illegible]	3.84	44.74	-7.93
1.577	13.43	-6.20	61.38	28.34
1.735	4.55	-4.15	118.63	99.46
1.893	4.13	-3.46	142.27	119.15
2.051	7.64	-2.65	188.64	189.39
[illegible]	[illegible]	-1.92	259.86	243.36
2.366	[illegible]	-1.40	350.91	290.69
2.524	[illegible]	-.86	503.43	290.57
2.682	1.31	-.51	662.89	258.07
2.839	[illegible]	-.08	822.85	54.40
2.997	1.11	.15	884.75	-119.56
3.155	[illegible]	.62	693.16	-394.28
3.313	[illegible]	1.08	462.88	-471.62
3.470	1.12	1.53	311.52	-425.56
3.628	[illegible]	1.97	212.90	-391.98
3.786	1.31	2.80	137.09	-293.01
3.944	1.47	3.46	104.02	-244.83
[illegible]	2.54	4.91	63.12	-140.67
[illegible]	[illegible]	6.70	68.36	-104.57
4.417	[illegible]	7.41	66.92	-58.82
4.575	[illegible]	-.30	64.33	1.24
4.732	[illegible]	-5.75	73.68	40.78
[illegible]	[illegible]	-4.33	110.22	81.02
[illegible]	3.70	-3.02	162.21	132.40
[illegible]	2.70	-1.56	242.55	176.08
[illegible]	[illegible]	-1.33	327.95	192.15
[illegible]	[illegible]	-.74	469.65	189.91
5.679	[illegible]	-.29	594.67	105.80
[illegible]	1.46	.15	668.81	-67.78
[illegible]	[illegible]	.45	670.64	-225.21
[illegible]	[illegible]	.82	546.63	-339.57
[illegible]	[illegible]	1.14	438.32	-454.26
[illegible]	[illegible]	1.53	308.87	-433.55
[illegible]	1.15	1.86	236.78	-387.08
[illegible]	[illegible]	2.38	171.37	-331.60
[illegible]	[illegible]	3.06	[illegible]	-270.90
[illegible]	1.76	3.84	92.64	-215.21
[illegible]	[illegible]	4.90	[illegible]	-159.78
[illegible]	[illegible]	6.21	[illegible]	-102.70
7.572	[illegible]	6.47	[illegible]	-44.97
[illegible]	[illegible]	-3.81	[illegible]	26.28
[illegible]	[illegible]	-5.35	[illegible]	65.2[illegible]
[illegible]	[illegible]	-3.97	[illegible]	84.65
[illegible]	[illegible]	-2.94	168.14	144.54
[illegible]	[illegible]	-2.11	234.83	205.65
[illegible]	1.74	-1.41	337.27	245.15
[illegible]	[illegible]	-.88	475.04	256.46
[illegible]	[illegible]	-.43	[illegible]	174.44
[illegible]	[illegible]	-.03	[illegible]	15.75
[illegible]	[illegible]	.33	722.66	-183.45
[illegible]	[illegible]	.67	618.71	-329.00
[illegible]	1.75	1.07	[illegible]	-395.21

TABLE 3.4

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .1289 BETAL/BETAC = 1.143 L1/LAMDAC = 1.500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAC = .010 RL = 162.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
RAW DATA			NORMALIZED DATA				
.002	9.603	144.00	5.360	9.00	5.314	.842	.003
.015	9.389	133.40	5.260	-1.60	5.258	-.147	.025
.029	9.139	123.40	5.120	-11.60	5.015	-1.030	.050
.056	8.604	102.60	4.820	-32.40	4.070	-2.583	.100
.087	8.104	82.00	4.540	-53.00	2.732	-3.626	.150
.116	7.747	60.70	4.340	-74.30	1.174	-4.178	.200
.145	7.390	40.00	4.140	-95.00	-.361	-4.124	.250
.175	7.033	19.60	3.940	-115.40	-1.690	-3.559	.300
.204	6.890	-.80	3.860	-135.80	-2.767	-2.691	.350
.233	6.605	-20.80	3.700	-155.80	-3.375	-1.517	.400
.262	6.212	-40.90	3.480	-175.90	-3.471	-.249	.450
.291	5.998	-61.80	3.360	-196.80	-3.217	.971	.500
.320	5.605	-82.40	3.140	-217.40	-2.494	1.907	.550
.349	5.105	-103.60	2.860	-238.60	-1.490	2.441	.600
.378	4.784	-124.80	2.680	-255.80	-.475	2.638	.650
.407	4.570	-146.00	2.560	-281.00	.488	2.513	.700
.436	4.391	-167.00	2.460	-302.00	1.304	2.086	.750
.465	4.284	-186.60	2.400	-321.60	1.881	1.491	.800
.495	4.105	-206.00	2.300	-341.00	2.175	.749	.850
.524	3.820	-225.20	2.140	-360.20	2.140	-.007	.900
.553	3.534	-245.50	1.980	-380.50	1.855	-.693	.950
.582	3.284	-266.50	1.840	-401.50	1.378	-1.219	1.000
.611	3.142	-288.20	1.760	-423.20	.794	-1.571	1.050
.640	3.070	-311.00	1.720	-446.00	.120	-1.716	1.100
.669	2.999	-333.00	1.680	-468.00	-.519	-1.598	1.150
.698	2.999	-352.50	1.680	-487.50	-1.023	-1.333	1.200
.727	2.963	-371.40	1.660	-506.40	-1.383	-.919	1.250
.756	2.820	-389.00	1.580	-524.00	-1.519	-.436	1.300
.785	2.570	-406.50	1.440	-541.50	-1.440	.038	1.350
.815	2.265	-426.00	1.280	-561.00	-1.195	.459	1.400
.844	2.035	-449.00	1.140	-584.00	-.820	.792	1.450
.863	1.856	-467.20	1.040	-602.20	-.485	.920	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
RAW DATA			NORMALIZED DATA				
.003	9.945	-2.00	25.500	-2.00	25.484	-.890	.006
.015	8.159	-10.70	20.920	-10.70	20.556	-3.884	.025
.029	7.358	-20.70	19.380	-20.70	18.129	-6.850	.050
.058	7.160	-41.20	18.360	-41.20	13.814	-12.094	.100
.087	6.809	-61.60	17.460	-61.60	8.304	-15.359	.150
.116	6.513	-81.50	16.700	-81.50	2.468	-16.517	.200
.145	6.170	-101.60	15.820	-101.60	-3.181	-15.497	.250
.175	5.772	-121.20	14.800	-121.20	-7.667	-12.659	.300
.204	5.569	-141.80	14.280	-141.80	-11.222	-8.831	.350
.233	5.273	-163.30	13.520	-163.30	-12.950	-3.885	.400
.262	4.976	-184.70	12.760	-184.70	-12.717	1.046	.450
.291	4.727	-205.90	12.120	-205.90	-10.903	5.294	.500
.320	4.579	-226.40	11.740	-226.40	-8.096	8.502	.550
.349	4.329	-246.20	11.100	-246.20	-4.479	10.156	.600
.378	4.025	-266.00	10.320	-266.00	-.720	10.295	.650
.407	3.783	-286.40	9.700	-286.40	2.739	9.305	.700
.436	3.533	-307.20	9.060	-307.20	5.478	7.217	.750
.465	3.331	-329.00	8.540	-329.00	7.320	4.398	.800
.495	3.229	-350.70	8.280	-350.70	8.171	1.338	.850
.524	3.081	-372.00	7.900	-372.00	7.727	-1.643	.900
.553	2.987	-392.00	7.660	-392.00	6.496	-4.059	.950
.582	2.925	-411.20	7.500	-411.20	4.700	-5.845	1.000
.611	2.831	-429.50	7.260	-429.50	2.543	-6.800	1.050
.640	2.722	-448.60	6.980	-448.60	.171	-6.978	1.100
.669	2.426	-468.00	6.220	-468.00	-1.922	-5.916	1.150
.698	2.278	-489.60	5.840	-489.60	-3.723	-4.500	1.200
.727	2.028	-513.00	5.200	-513.00	-4.633	-2.361	1.250
.756	1.997	-537.00	5.120	-537.00	-5.113	-.268	1.300
.785	2.012	-560.50	5.160	-560.50	-4.833	1.807	1.350
.815	2.028	-580.80	5.200	-580.80	-3.936	3.398	1.400
.844	2.051	-599.20	5.260	-599.20	-2.693	4.518	1.450
.865	2.129	-611.00	5.460	-611.00	-1.778	5.163	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .1289 BETAL/BETAC = 1.143 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .010 RL = 162.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.996	140.00	5.600	10.00	5.515	.972	.003
.021	9.211	129.60	5.160	-.40	5.160	-.036	.025
.041	8.996	119.00	5.040	-11.00	4.947	-.962	.050
.082	8.354	96.50	4.680	-33.50	3.903	-2.583	.100
.123	8.032	76.00	4.500	-54.00	2.645	-3.641	.150
.164	7.783	54.20	4.360	-75.80	1.070	-4.227	.200
.205	7.533	33.20	4.220	-96.80	-.500	-4.190	.250
.246	7.390	14.10	4.140	-115.90	-1.808	-3.724	.300
.287	7.104	-5.00	3.980	-135.00	-2.819	-2.814	.350
.328	6.533	-24.40	3.600	-154.40	-3.301	-1.581	.400
.369	5.998	-44.80	3.360	-174.80	-3.346	-.305	.450
.410	5.533	-66.80	3.100	-196.80	-2.968	.896	.500
.451	5.212	-89.00	2.920	-219.00	-2.269	1.838	.550
.492	4.998	-111.50	2.800	-241.50	-1.336	2.461	.600
.533	4.855	-132.40	2.720	-262.40	-.360	2.696	.650
.574	4.855	-152.50	2.720	-282.50	.589	2.656	.700
.615	4.784	-171.50	2.660	-301.50	1.400	2.285	.750
.656	4.605	-189.40	2.580	-319.40	1.959	1.679	.800
.697	4.213	-207.80	2.360	-337.80	2.185	.892	.850
.738	3.748	-227.40	2.100	-357.40	2.098	.095	.900
.780	3.391	-250.40	1.900	-380.40	1.781	-.662	.950
.807	3.142	-268.00	1.760	-398.00	1.387	-1.084	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	10.210	4.00	26.160	4.00	26.116	1.826	.006
.021	8.455	-4.30	21.680	-4.30	21.619	-1.626	.025
.041	8.003	-14.10	20.520	-14.10	19.902	-4.999	.050
.082	7.597	-34.00	19.480	-34.00	16.150	-10.893	.100
.123	7.043	-52.50	18.060	-52.50	10.994	-14.328	.150
.164	6.638	-72.50	17.020	-72.50	5.118	-16.232	.200
.205	6.139	-93.50	15.740	-93.50	-.961	-15.711	.250
.246	5.788	-115.00	14.840	-115.00	-6.272	-13.450	.300
.287	5.539	-137.80	14.200	-137.80	-10.519	-9.536	.350
.328	5.382	-159.50	13.800	-155.50	-12.926	-4.833	.400
.369	5.234	-180.20	13.420	-180.20	-13.420	.047	.450
.410	4.984	-200.00	12.780	-200.00	-12.009	4.371	.500
.451	4.727	-218.50	12.120	-218.50	-9.485	7.545	.550
.492	4.430	-237.50	11.360	-237.50	-6.104	9.581	.600
.533	4.072	-257.00	10.440	-257.00	-2.349	10.172	.650
.574	3.822	-278.50	9.800	-278.50	1.449	9.692	.700
.615	3.424	-301.50	8.780	-301.50	4.588	7.486	.750
.656	3.424	-325.40	8.780	-325.40	7.227	4.986	.800
.697	3.424	-348.60	8.780	-348.60	8.607	1.735	.850
.738	3.471	-368.80	8.900	-368.80	8.795	-1.362	.900
.780	3.526	-387.00	9.040	-387.00	8.055	-4.104	.950
.810	3.674	-398.80	9.420	-398.80	7.341	-5.903	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .1289 BETAL/BETAC = 1.143 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .010 RL = 162.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	7.556	127.00	5.140	7.00	5.102	.626	.003
.035	7.203	115.60	4.900	-4.40	4.886	-.376	.025
.070	7.056	104.20	4.800	-15.80	4.619	-1.307	.050
.139	6.909	80.80	4.700	-39.20	3.642	-2.971	.100
.209	6.762	59.00	4.600	-61.00	2.230	-4.023	.150
.278	6.791	39.20	4.620	-80.80	.739	-4.561	.200
.348	6.762	20.70	4.600	-95.30	-.743	-4.540	.250
.417	6.439	3.30	4.380	-116.70	-1.968	-3.913	.300
.487	5.909	-14.50	4.020	-134.50	-2.818	-2.867	.350
.557	5.292	-32.40	3.600	-152.40	-3.190	-1.668	.400
.626	4.763	-57.50	3.240	-177.50	-3.237	-.141	.450
.673	4.410	-75.40	3.000	-195.40	-2.892	.797	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	10.007	.00	25.660	.00	25.660	.000	.006
.035	8.112	-7.70	20.800	-7.70	20.612	-2.787	.025
.070	7.667	-16.70	19.660	-16.70	18.831	-5.649	.050
.139	7.114	-35.00	18.240	-35.00	14.941	-10.462	.100
.209	6.334	-53.80	16.240	-53.80	9.591	-13.105	.150
.278	5.944	-75.00	15.240	-75.00	3.944	-14.721	.200
.348	5.281	-98.00	13.540	-98.00	-1.884	-13.408	.250
.417	5.281	-122.30	13.540	-122.30	-7.235	-11.445	.300
.487	5.390	-145.80	13.820	-145.80	-11.430	-7.766	.350
.557	5.444	-166.00	13.960	-166.00	-13.545	-3.377	.400
.626	5.616	-184.00	14.400	-184.00	-14.365	1.004	.450
.678	5.780	-196.00	14.820	-196.00	-14.246	4.085	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0911 BETAL/BETAC = 1.052 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .020 RL = 193.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
	RAW DATA		NORMALIZED DATA				
.002	8.604	124.50	4.820	4.50	4.805	.378	.003
.014	8.390	113.70	4.700	-6.30	4.672	-.516	.025
.029	8.140	103.40	4.560	-16.60	4.370	-1.303	.050
.058	7.854	83.90	4.400	-36.10	3.555	-2.592	.100
.086	7.604	63.80	4.260	-56.20	2.370	-3.540	.150
.115	7.461	44.50	4.180	-75.50	1.047	-4.047	.200
.144	7.283	25.10	4.080	-94.50	-.348	-4.065	.250
.173	7.104	6.50	3.980	-113.50	-1.587	-3.650	.300
.201	7.133	-12.00	3.940	-132.00	-2.636	-2.928	.350
.230	6.854	-30.80	3.840	-150.80	-3.352	-1.873	.400
.259	6.605	-49.00	3.700	-169.00	-3.632	-.706	.450
.288	6.437	-68.30	3.640	-188.30	-3.602	.525	.500
.317	6.133	-87.00	3.360	-207.00	-3.018	1.534	.550
.345	5.783	-106.90	3.240	-226.50	-2.214	2.366	.600
.374	5.641	-126.60	3.160	-246.60	-1.255	2.900	.650
.403	5.494	-145.60	3.080	-265.80	-.226	3.072	.700
.432	5.[illegible]	-165.60	3.020	-285.60	.812	2.909	.750
.460	5.355	-183.50	3.000	-303.50	1.656	2.502	.800
.489	5.212	-201.50	2.920	-321.50	2.285	1.818	.850
.518	4.962	-219.70	2.780	-339.70	2.607	.964	.900
.547	4.712	-238.60	2.640	-358.60	2.639	.065	.950
.575	4.534	-258.00	2.540	-378.00	2.416	-.785	1.000
.604	4.284	-277.30	2.400	-397.30	1.909	-1.454	1.050
.633	4.248	-299.20	2.380	-419.20	1.219	-2.044	1.100
.662	4.105	-318.00	2.300	-438.00	.478	-2.250	1.150
.691	4.213	-337.50	2.360	-457.50	-.308	-2.340	1.200
.719	4.177	-356.00	2.340	-476.00	-1.026	-2.103	1.250
.748	4.105	-373.00	2.300	-493.00	-1.569	-1.682	1.300
.777	3.963	-390.00	2.220	-510.00	-1.923	-1.110	1.350
.806	3.748	-407.50	2.100	-527.50	-2.050	-.455	1.400
.834	3.534	-426.50	1.980	-546.50	-1.967	.224	1.450
.854	3.264	-440.80	1.840	-560.80	-1.720	.653	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICOOUL/VOLT-M

Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
	RAW DATA		NORMALIZED DATA				
.003	9.988	-2.00	23.500	-2.00	23.486	-.820	.006
.014	7.743	-9.80	18.220	-5.80	17.954	-3.101	.025
.029	7.089	-19.20	16.680	-15.20	15.752	-5.485	.050
.058	6.740	-37.70	15.860	-37.70	12.549	-9.699	.100
.086	6.443	-56.50	15.160	-56.50	8.279	-12.700	.150
.115	6.290	-75.40	14.800	-75.40	3.731	-14.322	.200
.144	5.993	-94.20	14.100	-94.20	-1.033	-14.062	.250
.173	5.746	-112.60	13.520	-112.60	-5.196	-12.482	.300
.201	5.669	-132.00	13.340	-132.00	-8.926	-9.914	.350
.230	5.576	-152.00	13.120	-152.00	-11.584	-6.159	.400
.259	5.398	-171.40	12.700	-171.40	-12.557	-1.899	.450
.288	5.142	-190.40	12.100	-190.40	-11.901	2.184	.500
.317	5.091	-209.00	11.980	-209.00	-10.478	5.808	.550
.345	4.972	-227.20	11.700	-227.20	-7.949	8.585	.600
.374	4.743	-245.60	11.160	-245.60	-4.610	10.163	.650
.403	4.598	-264.40	10.820	-264.40	-1.056	10.768	.700
.432	4.343	-283.60	10.220	-283.60	2.403	9.933	.750
.460	4.148	-303.50	9.760	-303.50	5.387	8.139	.800
.489	4.097	-323.60	9.640	-323.60	7.759	5.721	.850
.518	3.961	-343.50	9.320	-343.50	8.936	2.647	.900
.547	3.884	-363.00	9.140	-363.00	9.127	-.478	.950
.575	3.799	-381.60	8.940	-381.60	8.312	-3.291	1.000
.604	3.799	-399.20	8.940	-399.20	6.928	-5.650	1.050
.633	3.799	-417.40	8.940	-417.40	4.817	-7.532	1.100
.662	3.493	-434.80	8.220	-434.80	2.155	-7.932	1.150
.691	3.400	-453.80	8.000	-453.80	-.530	-7.982	1.200
.719	3.094	-473.70	7.280	-473.70	-2.926	-6.666	1.250
.748	3.094	-494.50	7.280	-494.50	-5.103	-5.192	1.300
.777	3.043	-516.40	7.160	-516.40	-6.561	-2.867	1.350
.806	3.043	-535.50	7.160	-535.50	-7.138	-.562	1.400
.834	3.196	-554.50	7.520	-554.50	-7.280	1.883	1.450
.856	3.493	-567.20	8.220	-567.20	-7.311	3.757	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0911 BETAL/BETAC = 1.052 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAC = .020 RL = 193.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	8.491	140.00	4.880	10.00	4.806	.847	.003
.020	7.900	129.30	4.540	-.70	4.540	-.055	.025
.040	7.830	119.00	4.500	-11.00	4.417	-.859	.050
.081	7.447	98.50	4.280	-31.50	3.649	-2.236	.100
.121	7.378	79.00	4.240	-51.00	2.668	-3.295	.150
.162	7.238	59.00	4.160	-71.00	1.354	-3.933	.200
.202	7.169	39.20	4.120	-90.80	-.058	-4.120	.250
.242	7.169	21.30	4.120	-108.70	-1.321	-3.903	.300
.283	6.995	3.00	4.020	-127.00	-2.419	-3.211	.350
.323	6.612	-14.50	3.800	-144.50	-3.094	-2.207	.400
.364	6.264	-33.00	3.600	-163.00	-3.443	-1.053	.450
.404	5.986	-53.00	3.440	-183.00	-3.435	.180	.500
.444	5.634	-72.90	3.240	-202.90	-2.985	1.261	.550
.485	5.494	-94.00	3.160	-224.00	-2.273	2.195	.600
.525	5.359	-113.50	3.080	-243.50	-1.374	2.756	.650
.566	5.464	-133.00	3.140	-263.00	-.383	3.117	.700
.606	5.603	-152.00	3.220	-282.00	.669	3.150	.750
.646	5.394	-169.00	3.100	-299.00	1.503	2.711	.800
.687	5.220	-185.80	3.000	-315.80	2.151	2.091	.850
.727	4.942	-203.40	2.840	-333.40	2.539	1.272	.900
.768	4.663	-222.40	2.680	-352.40	2.656	.354	.950
.795	4.350	-237.10	2.500	-367.10	2.481	-.309	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.005	9.736	-4.60	23.180	-4.60	23.105	-1.859	.006
.020	7.577	-12.00	18.040	-12.00	17.646	-3.751	.025
.040	7.073	-21.00	16.840	-21.00	15.721	-6.035	.050
.081	6.653	-39.50	15.840	-39.50	12.223	-10.075	.100
.121	6.325	-57.40	15.060	-57.40	8.114	-12.687	.150
.162	6.124	-76.60	14.580	-76.60	3.379	-14.183	.200
.202	5.872	-96.00	13.960	-96.00	-1.461	-13.903	.250
.242	5.569	-116.00	13.260	-116.00	-5.813	-11.918	.300
.283	5.418	-136.60	12.900	-136.60	-9.373	-8.863	.350
.323	5.267	-156.70	12.540	-156.70	-11.517	-4.960	.400
.364	5.216	-175.80	12.420	-175.80	-12.387	-.910	.450
.404	5.099	-194.50	12.140	-194.50	-11.753	3.040	.500
.444	5.065	-212.50	12.060	-212.50	-10.171	6.480	.550
.485	4.889	-230.40	11.640	-230.40	-7.420	8.969	.600
.525	4.570	-248.00	10.880	-248.00	-4.076	10.088	.650
.566	4.519	-267.00	10.760	-267.00	-.563	10.745	.700
.606	4.066	-287.20	9.680	-287.20	2.862	9.247	.750
.646	4.015	-308.00	9.560	-308.00	5.886	7.533	.800
.687	4.015	-329.50	9.560	-329.50	8.237	4.852	.850
.727	4.015	-349.70	9.560	-349.70	9.406	1.709	.900
.768	4.217	-368.80	10.040	-368.80	9.922	-1.536	.950
.797	4.670	-381.40	11.120	-381.40	10.353	-4.057	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0911 BETAL/BETAC = 1.052 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAC = .020 RL = 193.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	8.305	136.60	4.640	11.60	4.545	.933	.003
.034	7.983	124.90	4.460	-.10	4.460	-.008	.025
.068	7.804	114.30	4.360	-10.70	4.284	-.810	.050
.136	7.590	93.00	4.240	-32.00	3.596	-2.247	.100
.203	7.375	73.10	4.120	-51.90	2.542	-3.242	.150
.271	7.518	53.20	4.200	-71.80	1.312	-3.990	.200
.339	7.554	34.20	4.220	-90.80	-.059	-4.220	.250
.407	7.462	17.00	4.180	-108.00	-1.292	-3.975	.300
.474	7.196	.00	4.020	-125.00	-2.306	-3.293	.350
.542	6.802	-17.60	3.800	-142.60	-3.019	-2.308	.400
.610	6.480	-37.00	3.620	-162.00	-3.443	-1.119	.450
.656	6.014	-51.20	3.360	-176.20	-3.353	-.223	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.008	9.945	-3.00	23.400	-3.00	23.368	-1.225	.006
.034	7.709	-10.40	18.140	-10.40	17.842	-3.275	.025
.068	7.242	-19.20	17.040	-19.20	16.092	-5.604	.050
.136	6.808	-37.20	16.020	-37.20	12.760	-9.686	.100
.203	6.316	-54.00	14.860	-54.00	8.734	-12.022	.150
.271	6.162	-73.20	14.500	-73.20	4.191	-13.881	.200
.339	5.669	-93.30	13.340	-93.30	-.768	-13.318	.250
.407	5.568	-114.40	13.100	-114.40	-5.412	-11.930	.300
.474	5.516	-136.00	12.980	-136.00	-9.337	-9.017	.350
.542	5.516	-156.70	12.980	-156.70	-11.921	-5.134	.400
.610	5.865	-175.80	13.800	-175.80	-13.763	-1.011	.450
.660	6.468	-188.60	15.220	-188.60	-15.049	2.276	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0460   BETAL/BETAC = 1.018   L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ   PE = .067   D/LAMDAC = .080   RL = 270.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	7.392	128.10	3.840	10.10	3.780	.673	.003
.014	7.200	115.50	3.740	-2.50	3.736	-.163	.025
.029	7.084	104.50	3.680	-13.50	3.578	-.859	.050
.057	6.969	84.50	3.620	-33.50	3.019	-1.998	.100
.086	6.892	64.00	3.580	-54.00	2.104	-2.896	.150
.115	6.969	45.30	3.620	-72.70	1.076	-3.456	.200
.143	6.969	27.30	3.620	-90.70	-.044	-3.620	.250
.172	6.692	9.80	3.580	-108.20	-1.118	-3.401	.300
.201	6.615	-8.00	3.540	-126.00	-2.081	-2.864	.350
.229	6.699	-25.00	3.480	-143.00	-2.779	-2.094	.400
.258	6.506	-43.40	3.380	-161.40	-3.203	-1.078	.450
.286	6.468	-62.50	3.360	-180.50	-3.360	.029	.500
.315	6.160	-81.80	3.200	-199.80	-3.011	1.084	.550
.344	6.044	-101.00	3.140	-219.00	-2.440	1.976	.600
.372	6.063	-120.00	3.160	-238.00	-1.675	2.680	.650
.401	6.198	-138.00	3.220	-256.00	-.779	3.124	.700
.430	6.006	-155.80	3.120	-273.80	.207	3.113	.750
.458	6.006	-172.50	3.120	-290.50	1.093	2.922	.800
.487	5.890	-189.70	3.060	-307.70	1.871	2.421	.850
.516	5.698	-207.50	2.960	-325.50	2.439	1.677	.900
.544	5.467	-226.20	2.840	-344.20	2.733	.773	.950
.573	5.313	-245.50	2.760	-363.50	2.755	-.168	1.000
.602	5.236	-265.00	2.720	-383.00	2.504	-1.063	1.050
.630	5.352	-285.50	2.780	-403.50	2.017	-1.914	1.100
.659	5.313	-303.30	2.760	-421.30	1.325	-2.421	1.150
.687	5.506	-321.00	2.860	-439.00	.546	-2.807	1.200
.716	5.621	-337.00	2.920	-455.00	-.254	-2.909	1.250
.745	5.467	-354.90	2.840	-472.90	-1.105	-2.616	1.300
.773	5.274	-371.30	2.740	-489.30	-1.735	-2.120	1.350
.802	5.082	-389.20	2.640	-507.20	-2.219	-1.430	1.400
.831	4.967	-408.30	2.580	-526.30	-2.507	-.611	1.450
.850	4.697	-423.60	2.440	-541.60	-2.439	.068	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.003	9.982	-2.00	21.700	-2.00	21.687	-.757	.006
.014	7.332	-8.70	15.940	-8.70	15.757	-2.411	.025
.029	6.486	-17.40	14.100	-17.40	13.455	-4.216	.050
.057	5.989	-35.20	13.020	-35.20	10.639	-7.505	.100
.086	5.866	-53.50	12.360	-53.50	7.352	-9.936	.150
.115	5.594	-72.00	12.160	-72.00	3.758	-11.565	.200
.143	5.391	-90.50	11.720	-90.50	-.102	-11.720	.250
.172	5.244	-109.50	11.400	-109.50	-3.805	-10.746	.300
.201	5.290	-128.60	11.500	-128.60	-7.175	-8.987	.350
.229	5.373	-147.20	11.680	-147.20	-9.818	-6.327	.400
.258	5.290	-165.20	11.500	-165.20	-11.118	-2.938	.450
.286	5.175	-183.20	11.240	-183.20	-11.222	.627	.500
.315	5.143	-200.60	11.180	-200.60	-10.465	3.934	.550
.344	5.042	-218.00	10.960	-218.00	-8.637	6.748	.600
.372	4.839	-236.00	10.520	-236.00	-5.883	8.721	.650
.401	4.738	-254.80	10.300	-254.80	-2.701	9.940	.700
.430	4.545	-274.20	9.880	-274.20	.724	9.853	.750
.458	4.490	-293.60	9.760	-293.60	3.907	8.944	.800
.487	4.545	-313.00	9.880	-313.00	6.738	7.226	.850
.516	4.545	-331.40	9.880	-331.40	8.674	4.729	.900
.544	4.572	-349.40	9.940	-349.40	9.770	1.829	.950
.573	4.490	-366.40	9.760	-366.40	9.699	-1.088	1.000
.602	4.545	-383.00	9.880	-383.00	9.095	-3.860	1.050
.630	4.444	-400.00	9.660	-400.00	7.400	-6.209	1.100
.659	4.223	-418.00	9.160	-418.00	4.865	-7.785	1.150
.687	4.241	-437.00	9.220	-437.00	2.074	-8.984	1.200
.716	3.993	-456.70	8.680	-456.70	-1.013	-8.621	1.250
.745	4.039	-476.90	8.780	-476.90	-3.972	-7.830	1.300
.773	4.140	-496.50	9.000	-496.50	-6.528	-6.195	1.350
.802	4.241	-515.50	9.220	-515.50	-8.390	-3.823	1.400
.831	4.591	-533.60	9.980	-533.60	-9.918	-1.112	1.450
.852	5.336	-546.70	11.600	-546.70	-11.521	1.353	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0460 BETAL/BETAC = 1.018 L1/LAMDAC = 1.000

FREQUENCY = 300.00MHZ PE = .067 C/LAMDAC = .050 RL = 270.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	7.585	127.60	3.940	9.60	3.885	.657	.003
.020	7.161	115.00	3.720	-3.00	3.715	-.195	.025
.040	7.123	103.10	3.700	-14.90	3.576	-.951	.050
.080	7.007	83.00	3.640	-35.00	2.982	-2.088	.100
.120	7.007	63.70	3.640	-54.30	2.124	-2.956	.150
.161	7.007	44.80	3.640	-73.20	1.052	-3.485	.200
.201	7.007	26.50	3.640	-91.50	-.095	-3.639	.250
.241	7.007	9.80	3.640	-108.20	-1.137	-3.456	.300
.281	6.892	-7.80	3.580	-125.80	-2.094	-2.904	.350
.321	6.622	-25.30	3.440	-143.30	-2.758	-2.056	.400
.361	6.391	-43.70	3.320	-161.70	-3.152	-1.042	.450
.401	6.276	-62.70	3.260	-180.70	-3.260	.040	.500
.442	6.122	-82.60	3.180	-200.60	-2.977	1.119	.550
.482	6.122	-102.60	3.180	-220.60	-2.414	2.069	.600
.522	6.044	-120.50	3.140	-238.50	-1.641	2.677	.650
.562	6.276	-138.50	3.260	-256.50	-.761	3.170	.700
.602	6.314	-155.60	3.260	-273.60	.206	3.274	.750
.642	6.122	-172.80	3.180	-290.80	1.129	2.973	.800
.682	6.006	-190.00	3.120	-308.00	1.921	2.459	.850
.723	5.775	-208.50	3.000	-326.50	2.502	1.656	.900
.763	5.660	-228.10	2.940	-346.10	2.854	.706	.950
.790	5.390	-242.80	2.800	-360.80	2.800	-.039	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	9.997	-2.00	21.500	-2.00	21.487	-.750	.006
.020	7.347	-8.80	15.800	-8.80	15.614	-2.417	.025
.040	6.603	-17.50	14.200	-17.50	13.543	-4.270	.050
.080	6.045	-35.20	13.000	-35.20	10.623	-7.494	.100
.120	5.729	-52.80	12.320	-52.80	7.449	-9.813	.150
.161	5.599	-72.00	12.040	-72.00	3.721	-11.451	.200
.201	5.403	-91.10	11.620	-91.10	-.223	-11.618	.250
.241	5.347	-110.20	11.500	-110.20	-3.971	-10.793	.300
.281	5.375	-129.40	11.560	-129.40	-7.337	-8.933	.350
.321	5.320	-148.00	11.440	-148.00	-9.702	-6.062	.400
.361	5.301	-165.80	11.400	-165.80	-11.052	-2.797	.450
.401	5.199	-183.30	11.180	-183.30	-11.161	.644	.500
.442	5.199	-201.00	11.180	-201.00	-10.437	4.007	.550
.482	5.022	-218.50	10.800	-218.50	-8.452	6.723	.600
.522	4.827	-236.50	10.380	-236.50	-5.729	8.656	.650
.562	4.752	-255.80	10.220	-255.80	-2.507	9.908	.700
.602	4.544	-275.50	9.780	-275.50	.937	9.735	.750
.642	4.622	-295.00	9.940	-295.00	4.201	9.009	.800
.682	4.622	-314.70	9.940	-314.70	6.992	7.065	.850
.723	4.780	-333.50	10.280	-333.50	9.200	4.587	.900
.763	5.152	-351.70	11.080	-351.70	10.964	1.599	.950
.792	5.998	-364.40	12.900	-364.40	12.862	-.990	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0460 BETAL/BETAC = 1.018 L1/LAMDAC = .500

FREQUENCY = 300.00MHZ PE = .067 C/LAMDAC = .050 RL = 270.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	7.144	128.60	3.780	8.60	3.737	.565	.003
.034	6.880	116.60	3.640	-3.40	3.634	-.216	.025
.067	6.766	104.10	3.580	-15.90	3.443	-.981	.050
.134	6.766	82.40	3.580	-37.60	2.836	-2.184	.100
.201	6.804	61.10	3.600	-58.90	1.860	-3.083	.150
.268	7.031	45.20	3.720	-74.80	.975	-3.590	.200
.335	7.220	28.50	3.820	-91.50	-.100	-3.819	.250
.402	7.106	11.70	3.760	-108.30	-1.181	-3.570	.300
.469	6.880	-4.90	3.640	-124.90	-2.083	-2.985	.350
.536	6.615	-22.30	3.500	-142.30	-2.769	-2.140	.400
.604	6.426	-41.60	3.400	-161.60	-3.226	-1.073	.450
.649	5.972	-57.50	3.160	-177.50	-3.157	-.138	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	9.964	-5.00	21.200	-5.00	21.119	-1.848	.006
.034	7.323	-11.50	15.580	-11.50	15.267	-3.106	.025
.067	6.580	-19.60	14.000	-19.60	13.189	-4.696	.050
.134	5.978	-36.50	12.720	-36.50	10.225	-7.566	.100
.201	5.527	-53.50	11.760	-53.50	6.995	-9.453	.150
.268	5.377	-72.60	11.440	-72.60	3.421	-10.917	.200
.335	5.085	-92.40	10.820	-92.40	-.453	-10.811	.250
.402	5.132	-112.90	10.920	-112.90	-4.249	-10.059	.300
.469	5.264	-133.20	11.200	-133.20	-7.667	-8.164	.350
.536	5.377	-152.50	11.440	-152.50	-10.147	-5.282	.400
.604	5.856	-171.00	12.460	-171.00	-12.307	-1.949	.450
.653	6.824	-184.20	14.520	-184.20	-14.481	1.063	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0280 BETAL/BETAC = 1.016 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAC = .100 RL = 271.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	7.548	130.60	3.700	10.60	3.637	.681	.003
.014	7.333	118.80	3.580	-1.20	3.579	-.075	.025
.029	7.058	107.50	3.460	-12.50	3.378	-.749	.050
.057	6.732	87.60	3.300	-32.40	2.786	-1.768	.100
.086	6.610	68.00	3.240	-52.00	1.995	-2.553	.150
.115	6.529	48.80	3.200	-71.20	1.031	-3.029	.200
.143	6.467	28.60	3.180	-91.20	-.067	-3.179	.250
.172	6.487	9.70	3.180	-110.30	-1.103	-2.982	.300
.200	6.528	-8.60	3.200	-128.60	-1.996	-2.501	.350
.229	6.650	-26.30	3.260	-146.30	-2.712	-1.809	.400
.258	6.650	-43.50	3.260	-163.50	-3.126	-.926	.450
.286	6.528	-61.20	3.200	-181.20	-3.199	.067	.500
.315	6.365	-78.70	3.120	-198.70	-2.955	1.000	.550
.344	6.202	-97.00	3.040	-217.00	-2.428	1.830	.600
.372	6.038	-115.40	2.960	-235.40	-1.681	2.436	.650
.401	5.916	-134.50	2.900	-254.50	-.775	2.795	.700
.430	5.916	-153.60	2.900	-273.60	.182	2.894	.750
.458	5.957	-172.50	2.920	-292.50	1.117	2.698	.800
.487	6.038	-191.00	2.960	-311.00	1.942	2.234	.850
.515	5.998	-209.00	2.940	-325.00	2.520	1.514	.900
.544	5.998	-226.40	2.940	-346.40	2.858	.691	.950
.573	6.038	-244.40	2.960	-364.40	2.951	-.227	1.000
.601	5.957	-261.00	2.920	-381.00	2.726	-1.046	1.050
.630	5.875	-279.30	2.880	-395.30	2.229	-1.824	1.100
.659	5.753	-296.90	2.820	-416.90	1.540	-2.362	1.150
.687	5.794	-315.80	2.840	-435.80	.697	-2.753	1.200
.716	5.834	-333.80	2.860	-453.80	-.190	-2.854	1.250
.745	5.753	-353.00	2.820	-473.00	-1.102	-2.596	1.300
.773	5.753	-371.40	2.820	-491.40	-1.865	-2.115	1.350
.802	5.712	-389.00	2.800	-509.00	-2.400	-1.442	1.400
.830	5.794	-407.70	2.840	-527.70	-2.775	-.605	1.450
.850	5.590	-422.70	2.740	-542.70	-2.737	.129	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	10.039	-7.00	20.700	-7.00	20.546	-2.523	.006
.014	7.382	-13.40	15.220	-13.40	14.806	-3.527	.025
.029	6.373	-22.20	13.140	-22.20	12.166	-4.965	.050
.057	5.520	-40.60	12.000	-40.60	9.111	-7.809	.100
.086	5.626	-58.60	11.600	-58.60	6.044	-9.901	.150
.115	5.569	-76.60	11.480	-76.60	2.660	-11.167	.200
.143	5.471	-94.20	11.280	-94.20	-.826	-11.250	.250
.172	5.325	-111.60	10.980	-111.60	-4.042	-10.209	.300
.200	5.267	-129.50	10.860	-129.50	-6.908	-8.380	.350
.229	5.239	-148.10	10.800	-148.10	-9.169	-5.707	.400
.258	5.073	-167.00	10.460	-167.00	-10.192	-2.353	.450
.286	4.937	-186.20	10.180	-186.20	-10.120	1.099	.500
.315	4.966	-205.00	10.240	-205.00	-9.281	4.328	.550
.344	5.025	-223.70	10.360	-223.70	-7.490	7.158	.600
.372	5.025	-241.40	10.360	-241.40	-4.959	9.096	.650
.401	5.073	-259.00	10.460	-259.00	-1.996	10.268	.700
.430	4.966	-276.30	10.240	-276.30	1.124	10.178	.750
.458	4.918	-294.00	10.140	-294.00	4.124	9.263	.800
.487	4.850	-311.50	10.000	-311.50	6.626	7.490	.850
.515	4.666	-330.00	9.620	-330.00	8.331	4.810	.900
.544	4.569	-349.00	9.420	-349.00	9.247	1.797	.950
.573	4.520	-368.00	9.320	-368.00	9.229	-1.297	1.000
.601	4.569	-387.00	9.420	-387.00	8.393	-4.277	1.050
.630	4.617	-404.90	9.520	-404.90	6.743	-6.720	1.100
.659	4.617	-422.80	9.520	-422.80	4.352	-8.467	1.150
.687	4.617	-440.50	9.520	-440.50	1.571	-9.389	1.200
.716	4.617	-458.40	9.520	-458.40	-1.391	-9.418	1.250
.745	4.714	-477.00	9.720	-477.00	-4.413	-8.661	1.300
.773	4.714	-494.70	9.720	-494.70	-6.837	-6.909	1.350
.802	4.666	-514.00	9.620	-514.00	-8.646	-4.217	1.400
.830	5.073	-534.40	10.460	-534.40	-10.410	-1.021	1.450
.852	6.072	-549.30	12.520	-549.30	-12.355	2.023	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0280 BETAL/BETAC = 1.016 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .100 RL = 271.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	7.793	128.80	3.820	8.80	3.775	.584	.003
.020	7.262	117.00	3.560	-3.00	3.555	-.186	.025
.040	7.058	106.40	3.460	-13.60	3.363	-.814	.050
.080	6.854	86.30	3.360	-33.70	2.795	-1.864	.100
.120	6.732	67.10	3.300	-52.90	1.991	-2.632	.150
.161	6.528	47.90	3.200	-72.10	.984	-3.045	.200
.201	6.487	28.00	3.180	-92.00	-.111	-3.178	.250
.241	6.467	9.30	3.130	-110.70	-1.124	-2.975	.300
.281	6.487	-9.70	3.180	-129.70	-2.031	-2.447	.350
.321	6.467	-28.00	3.140	-148.00	-2.697	-1.685	.400
.361	6.487	-45.90	3.180	-165.90	-3.084	-.775	.450
.401	6.569	-63.60	3.220	-183.60	-3.214	.202	.500
.441	6.446	-80.00	3.160	-200.00	-2.969	1.081	.550
.482	6.365	-99.00	3.120	-215.00	-2.425	1.963	.600
.522	6.161	-116.00	3.020	-236.00	-1.689	2.504	.650
.562	6.161	-135.00	3.020	-255.00	-.782	2.917	.700
.602	6.120	-153.60	3.000	-273.60	.188	2.994	.750
.642	5.998	-173.00	2.940	-293.00	1.149	2.706	.800
.682	6.079	-191.60	2.980	-311.60	1.979	2.228	.850
.722	6.038	-210.00	2.960	-330.00	2.563	1.480	.900
.762	6.079	-228.40	2.980	-348.40	2.919	.599	.950
.790	5.998	-243.00	2.940	-363.00	2.936	-.154	.984

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	10.045	-6.00	20.500	-6.00	20.388	-2.143	.006
.020	7.232	-12.90	14.760	-12.90	14.387	-3.295	.025
.040	6.409	-21.60	13.080	-21.60	12.161	-4.815	.050
.080	5.831	-40.10	11.900	-40.10	9.103	-7.665	.100
.120	5.625	-59.00	11.480	-55.00	5.913	-9.840	.150
.161	5.625	-77.00	11.480	-77.00	2.582	-11.186	.200
.201	5.547	-94.80	11.320	-94.80	-.947	-11.280	.250
.241	5.473	-112.00	11.180	-112.00	-4.188	-10.366	.300
.281	5.400	-129.50	11.020	-129.50	-7.010	-8.503	.350
.321	5.223	-147.60	10.660	-147.60	-9.001	-5.712	.400
.361	5.027	-166.40	10.260	-166.40	-9.972	-2.413	.450
.401	4.939	-185.50	10.080	-185.50	-10.034	.966	.500
.441	4.920	-204.50	10.040	-204.50	-9.136	4.163	.550
.482	4.920	-223.60	10.040	-223.60	-7.271	6.924	.600
.522	4.920	-241.80	10.040	-241.80	-4.744	8.848	.650
.562	4.969	-260.20	10.140	-260.20	-1.726	9.992	.700
.602	5.027	-278.00	10.260	-278.00	1.428	10.160	.750
.642	5.076	-295.30	10.360	-295.30	4.427	9.366	.800
.682	5.076	-313.50	10.360	-313.50	7.131	7.515	.850
.722	4.969	-332.30	10.140	-332.30	8.978	4.713	.900
.762	5.370	-352.80	10.960	-352.80	10.874	1.374	.950
.792	6.478	-369.50	13.220	-365.50	13.039	-2.182	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0280 BETAL/BETAC = 1.016 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .100 RL = 271.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	7.335	128.40	3.760	8.40	3.720	.549	.003
.034	7.272	116.40	3.600	-3.60	3.593	-.226	.025
.067	7.151	106.00	3.540	-14.00	3.435	-.856	.050
.134	6.864	85.70	3.400	-34.30	2.809	-1.916	.100
.201	6.626	67.90	3.280	-52.10	2.015	-2.588	.150
.268	6.626	48.40	3.280	-71.60	1.035	-3.112	.200
.335	6.626	29.10	3.280	-90.90	-.052	-3.280	.250
.402	6.424	9.20	3.180	-110.80	-1.129	-2.973	.300
.469	6.504	-10.00	3.220	-130.00	-2.070	-2.467	.350
.536	6.504	-29.20	3.220	-149.20	-2.766	-1.649	.400
.603	6.545	-47.60	3.240	-167.60	-3.164	-.696	.450
.649	6.504	-62.40	3.220	-182.40	-3.217	.135	.484

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	10.045	-4.00	20.500	-4.00	20.450	-1.430	.006
.034	7.281	-10.70	14.860	-10.70	14.602	-2.759	.025
.067	6.383	-19.60	13.020	-19.60	12.266	-4.368	.050
.134	5.772	-39.00	11.780	-39.00	9.155	-7.413	.100
.201	5.527	-57.40	11.280	-57.40	6.077	-9.503	.150
.268	5.527	-75.80	11.280	-75.80	2.767	-10.935	.200
.335	5.527	-93.70	11.280	-93.70	-.728	-11.256	.250
.402	5.576	-111.00	11.380	-111.00	-4.078	-10.624	.300
.469	5.574	-129.40	11.380	-129.40	-7.223	-8.794	.350
.536	5.479	-148.00	11.180	-148.00	-9.481	-5.924	.400
.603	5.831	-168.20	11.900	-168.20	-11.649	-2.434	.450
.653	6.831	-183.50	13.940	-183.50	-13.914	.851	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0310 BETAL/BETAC = 1.016 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .250 RL = 290.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	RAW DATA IRMAG	IRFAZ	NORMALIZED DATA INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	7.718	130.70	3.400	10.70	3.341	.631	.003
.014	7.491	118.80	3.300	-1.20	3.299	-.069	.025
.029	7.309	108.40	3.220	-11.60	3.154	-.647	.050
.057	6.992	89.50	3.080	-30.50	2.654	-1.563	.100
.086	6.674	71.30	2.940	-48.70	1.940	-2.209	.150
.115	6.401	52.60	2.820	-67.40	1.084	-2.603	.200
.143	6.084	33.00	2.680	-87.00	.140	-2.676	.250
.172	5.857	12.80	2.580	-107.20	-.763	-2.465	.300
.200	5.857	-8.20	2.580	-128.20	-1.595	-2.028	.350
.229	5.947	-28.30	2.620	-148.30	-2.229	-1.377	.400
.258	6.084	-47.00	2.680	-167.00	-2.611	-.603	.450
.286	6.401	-64.80	2.820	-184.80	-2.810	.236	.500
.315	6.265	-81.50	2.760	-201.50	-2.568	1.012	.550
.344	6.174	-97.80	2.720	-217.80	-2.149	1.667	.600
.372	6.038	-114.50	2.660	-234.50	-1.545	2.166	.650
.401	5.811	-132.50	2.560	-252.50	-.770	2.442	.700
.430	5.630	-151.30	2.480	-271.30	.056	2.479	.750
.458	5.493	-171.50	2.420	-291.50	.887	2.252	.800
.487	5.493	-192.00	2.420	-312.00	1.619	1.798	.850
.515	5.539	-211.50	2.440	-331.50	2.144	1.164	.900
.544	5.675	-230.00	2.500	-350.00	2.462	.434	.950
.573	5.993	-247.80	2.640	-367.80	2.616	-.358	1.000
.601	5.993	-263.20	2.640	-383.20	2.427	-1.040	1.050
.630	5.993	-280.00	2.640	-400.00	2.022	-1.697	1.100
.659	5.857	-295.80	2.580	-415.80	1.650	-2.134	1.150
.687	5.766	-313.50	2.540	-433.50	.721	-2.435	1.200
.716	5.675	-332.20	2.500	-452.20	-.096	-2.498	1.250
.745	5.403	-352.00	2.380	-472.00	-.892	-2.207	1.300
.773	5.403	-371.60	2.380	-491.60	-1.580	-1.780	1.350
.802	5.357	-392.00	2.360	-512.00	-2.084	-1.108	1.400
.830	5.448	-411.80	2.400	-531.80	-2.375	-.342	1.450
.850	5.403	-427.70	2.380	-547.70	-2.359	.319	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

Z/H	RAW DATA QRMAG	QRFAZ	NORMALIZED DATA QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	9.990	-8.00	18.000	-8.00	17.825	-2.505	.006
.014	7.171	-14.70	12.920	-14.70	12.497	-3.279	.025
.029	6.149	-23.20	11.080	-23.20	10.184	-4.365	.050
.057	5.550	-42.40	10.000	-42.40	7.385	-6.743	.100
.086	5.372	-61.90	9.680	-61.90	4.559	-8.539	.150
.115	5.395	-80.50	9.720	-80.50	1.604	-9.587	.200
.143	5.450	-98.10	9.820	-98.10	-1.384	-9.722	.250
.172	5.395	-114.70	9.720	-114.70	-4.062	-8.831	.300
.200	5.395	-130.60	9.720	-130.60	-6.326	-7.380	.350
.229	5.295	-147.40	9.540	-147.40	-8.037	-5.140	.400
.258	4.995	-164.80	9.000	-164.80	-8.685	-2.360	.450
.286	4.673	-183.60	8.420	-183.60	-8.403	.529	.500
.315	4.595	-203.60	8.280	-203.60	-7.587	3.315	.550
.344	4.595	-224.00	8.280	-224.00	-5.956	5.752	.600
.372	4.618	-243.60	8.320	-243.60	-3.699	7.452	.650
.401	4.795	-262.50	8.640	-262.50	-1.128	8.566	.700
.430	4.873	-279.80	8.780	-279.80	1.494	8.652	.750
.458	4.951	-296.50	8.920	-296.50	3.980	7.983	.800
.487	4.895	-312.80	8.820	-312.80	5.993	6.472	.850
.515	4.695	-329.50	8.460	-329.50	7.289	4.294	.900
.544	4.451	-347.50	8.020	-347.50	7.830	1.736	.950
.573	4.296	-366.60	7.740	-366.60	7.689	-.890	1.000
.601	4.196	-387.00	7.560	-387.00	6.736	-3.432	1.050
.630	4.251	-407.00	7.660	-407.00	5.224	-5.602	1.100
.659	4.396	-426.80	7.920	-426.80	3.120	-7.280	1.150
.687	4.595	-445.40	8.280	-445.40	.664	-8.253	1.200
.716	4.695	-462.80	8.460	-462.80	-1.874	-8.250	1.250
.745	4.895	-479.90	8.820	-479.90	-4.397	-7.646	1.300
.773	4.995	-497.10	9.000	-497.10	-6.593	-6.126	1.350
.802	4.895	-515.20	8.820	-515.20	-8.007	-3.700	1.400
.830	5.250	-534.70	9.460	-534.70	-9.420	-.874	1.450
.852	6.194	-550.00	11.160	-550.00	-10.990	1.938	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0310 BETAL/BETAC = 1.016 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .250 RL = 290.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	6.143	133.00	3.660	8.00	3.624	.509	.003
.020	7.520	122.00	3.380	-3.00	3.375	-.177	.025
.040	7.209	111.50	3.240	-13.50	3.150	-.756	.050
.080	6.808	92.00	3.060	-33.00	2.566	-1.667	.100
.120	6.497	72.90	2.920	-52.10	1.794	-2.304	.150
.161	6.141	53.20	2.760	-71.80	.862	-2.622	.200
.201	5.963	33.30	2.680	-91.70	-.080	-2.679	.250
.241	5.918	12.60	2.660	-112.40	-1.014	-2.459	.300
.281	5.918	-7.60	2.660	-132.60	-1.800	-1.958	.350
.321	5.963	-27.00	2.680	-152.00	-2.366	-1.258	.400
.361	6.008	-45.00	2.700	-170.00	-2.659	-.469	.450
.401	6.230	-62.80	2.800	-187.80	-2.774	.380	.500
.441	6.141	-80.30	2.760	-205.30	-2.495	1.180	.550
.482	6.141	-97.60	2.760	-222.60	-2.032	1.868	.600
.522	5.963	-114.00	2.680	-239.00	-1.380	2.297	.650
.562	5.963	-131.80	2.680	-256.80	-.612	2.609	.700
.602	6.008	-150.70	2.700	-275.70	.268	2.687	.750
.642	5.740	-169.30	2.580	-294.30	1.062	2.351	.800
.682	5.830	-188.60	2.620	-313.60	1.807	1.897	.850
.722	5.740	-207.30	2.580	-332.30	2.284	1.199	.900
.762	5.696	-225.60	2.560	-350.60	2.526	.418	.950
.790	5.429	-241.30	2.440	-366.30	2.425	-.268	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	10.004	-8.00	18.700	-8.00	18.518	-2.603	.006
.020	7.201	-14.50	13.460	-14.50	13.031	-3.370	.025
.040	6.356	-22.70	11.880	-22.70	10.960	-4.585	.050
.080	5.757	-41.00	10.760	-41.00	8.121	-7.059	.100
.120	5.553	-58.90	10.380	-58.90	5.362	-8.888	.150
.161	5.500	-76.80	10.280	-76.80	2.347	-10.008	.200
.201	5.350	-94.00	10.000	-94.00	-.698	-9.976	.250
.241	5.254	-111.60	9.820	-111.60	-3.615	-9.130	.300
.281	5.200	-128.30	9.720	-128.30	-6.024	-7.628	.350
.321	4.954	-146.30	9.260	-146.30	-7.709	-5.138	.400
.361	4.751	-165.00	8.880	-165.00	-8.577	-2.296	.450
.401	4.601	-184.40	8.600	-184.40	-8.575	.660	.500
.441	4.601	-204.40	8.600	-204.40	-7.832	3.553	.550
.482	4.601	-224.40	8.600	-224.40	-6.144	6.017	.600
.522	4.601	-241.00	8.600	-241.00	-4.169	7.522	.650
.562	4.601	-259.60	8.600	-259.60	-1.552	8.459	.700
.602	4.654	-277.00	8.700	-277.00	1.060	8.635	.750
.642	4.697	-294.80	8.780	-294.80	3.683	7.970	.800
.682	4.697	-313.10	8.780	-313.10	5.999	6.411	.850
.722	4.654	-333.20	8.700	-333.20	7.765	3.923	.900
.762	5.050	-354.80	9.440	-354.80	9.401	.856	.950
.792	6.039	-369.50	11.400	-369.50	11.244	-1.882	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFAL/BETAL = .0310 BETAL/BETAC = 1.016 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .067 D/LAMDAO = .250 RL = 290.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	6.194	132.30	3.480	7.30	3.452	.442	.003
.034	5.838	120.80	3.280	-4.20	3.271	-.240	.025
.067	5.696	109.70	3.200	-15.30	3.087	-.844	.050
.134	5.447	90.20	3.060	-34.80	2.513	-1.746	.100
.201	5.233	71.70	2.940	-53.30	1.757	-2.357	.150
.268	5.126	53.30	2.860	-71.70	.904	-2.734	.200
.335	4.984	34.80	2.800	-90.20	-.010	-2.800	.250
.402	4.735	14.80	2.660	-110.20	-.918	-2.496	.300
.469	4.628	-5.00	2.600	-130.00	-1.671	-1.992	.350
.536	4.521	-25.10	2.540	-150.10	-2.202	-1.266	.400
.603	4.521	-45.20	2.540	-170.20	-2.503	-.432	.450
.649	4.486	-61.20	2.520	-186.20	-2.505	.272	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	7.922	-8.00	18.640	-8.00	18.459	-2.594	.006
.034	5.695	-14.10	13.400	-14.10	12.996	-3.264	.025
.067	4.998	-22.50	11.760	-22.50	10.865	-4.500	.050
.134	4.454	-41.00	10.480	-41.00	7.909	-6.875	.100
.201	4.207	-59.40	9.900	-59.40	5.040	-8.521	.150
.268	4.156	-77.60	9.780	-77.60	2.100	-9.552	.200
.335	4.105	-95.50	9.660	-95.50	-.926	-9.616	.250
.402	4.105	-113.40	9.660	-113.40	-3.836	-8.866	.300
.469	4.105	-131.40	9.660	-131.40	-6.388	-7.246	.350
.536	4.063	-150.50	9.560	-150.50	-8.321	-4.708	.400
.603	4.309	-171.00	10.140	-171.00	-10.015	-1.586	.450
.653	5.100	-186.70	12.000	-186.70	-11.918	1.400	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0660   BETAL/BETAO = 1.109   L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAO = .010   RL = 180.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.890	122.70	5.940	10.70	5.837	1.103	.003
.014	9.590	112.40	5.760	.40	5.760	.040	.025
.029	9.457	101.80	5.680	-10.20	5.590	-1.006	.050
.058	8.791	82.20	5.400	-29.80	4.686	-2.684	.100
.087	8.658	61.00	5.200	-51.00	3.272	-4.041	.150
.116	8.458	39.30	5.080	-72.70	1.511	-4.850	.200
.145	8.358	18.50	5.020	-93.50	-.306	-5.011	.250
.174	8.358	-1.30	5.020	-113.30	-1.986	-4.611	.300
.203	8.358	-20.00	5.020	-132.00	-3.359	-3.731	.350
.232	8.258	-38.50	4.960	-150.50	-4.317	-2.442	.400
.261	7.892	-57.30	4.740	-169.30	-4.658	-.880	.450
.290	7.659	-77.80	4.600	-189.80	-4.533	.783	.500
.319	6.993	-98.60	4.200	-210.60	-3.615	2.138	.550
.348	6.693	-120.30	4.020	-232.30	-2.458	3.181	.600
.377	6.693	-141.60	4.020	-253.60	-1.135	3.856	.650
.406	6.693	-162.50	4.020	-274.50	.315	4.008	.700
.435	6.693	-182.10	4.020	-294.10	1.641	3.670	.750
.464	6.693	-200.60	4.020	-312.60	2.721	2.959	.800
.493	6.560	-218.70	3.940	-330.70	3.436	1.928	.850
.522	6.161	-237.20	3.700	-349.20	3.634	.693	.900
.551	5.694	-256.80	3.420	-368.80	3.380	-.523	.950
.580	5.395	-278.50	3.240	-390.50	2.792	-1.644	1.000
.609	5.161	-300.60	3.100	-412.60	1.883	-2.463	1.050
.638	5.161	-324.60	3.100	-436.60	.718	-3.016	1.100
.667	5.161	-344.40	3.100	-456.40	-.346	-3.081	1.150
.695	5.295	-364.00	3.180	-476.00	-1.394	-2.858	1.200
.724	5.335	-381.80	3.240	-493.80	-2.243	-2.339	1.250
.753	5.095	-400.00	3.060	-512.00	-2.702	-1.437	1.300
.782	4.695	-417.80	2.940	-529.80	-2.894	-.521	1.350
.811	4.496	-437.70	2.700	-549.70	-2.661	.455	1.400
.840	4.362	-458.60	2.620	-570.60	-2.255	1.334	1.450
.860	4.196	-475.50	2.520	-587.50	-1.702	1.858	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	9.990	.00	27.000	.00	27.000	.000	.006
.014	8.244	-9.00	22.280	-5.00	22.006	-3.485	.025
.029	7.496	-20.00	21.340	-20.00	20.053	-7.299	.050
.058	7.592	-38.50	20.520	-38.50	16.059	-12.774	.100
.087	7.541	-58.20	20.380	-58.20	10.739	-17.321	.150
.116	7.296	-77.00	19.720	-77.00	4.436	-19.215	.200
.145	6.993	-96.00	18.900	-96.00	-1.976	-18.796	.250
.174	6.593	-115.90	17.820	-115.90	-7.784	-16.030	.300
.203	6.423	-136.70	17.360	-136.70	-12.634	-11.906	.350
.232	6.342	-158.40	17.140	-158.40	-15.936	-6.310	.400
.261	6.246	-179.70	16.880	-179.70	-16.880	-.088	.450
.290	6.246	-200.20	16.680	-200.20	-15.842	5.829	.500
.319	6.194	-219.00	16.740	-219.00	-13.009	10.535	.550
.348	6.098	-237.50	16.480	-237.50	-8.855	13.899	.600
.377	5.794	-256.00	15.660	-256.00	-3.788	15.195	.650
.406	5.543	-275.30	14.960	-275.30	1.384	14.916	.700
.435	5.195	-295.50	14.040	-295.50	6.044	12.672	.750
.464	4.943	-317.80	13.360	-317.80	9.897	8.974	.800
.493	4.899	-340.30	13.240	-340.30	12.465	4.463	.850
.522	4.847	-362.00	13.100	-362.00	13.092	-.457	.900
.551	4.847	-382.10	13.100	-382.10	12.138	-4.929	.950
.580	4.847	-400.70	13.100	-400.70	9.932	-8.542	1.000
.609	4.847	-418.80	13.100	-418.80	6.786	-11.205	1.050
.638	4.544	-436.90	12.280	-436.90	2.783	-11.960	1.100
.667	4.196	-456.50	11.340	-456.50	-1.284	-11.267	1.150
.695	4.144	-477.90	11.200	-477.90	-5.241	-9.898	1.200
.724	3.848	-500.10	10.400	-500.10	-7.979	-6.671	1.250
.753	3.818	-522.50	10.320	-522.50	-9.842	-3.103	1.300
.782	3.900	-544.20	10.540	-544.20	-10.512	.772	1.350
.811	3.944	-563.40	10.660	-563.40	-9.783	4.234	1.400
.840	4.144	-581.50	11.200	-581.50	-8.388	7.421	1.450
.862	4.595	-594.20	12.420	-594.20	-7.265	10.073	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0660 BETAL/BETAC = 1.109 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .010 RL = 180.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.990	130.00	6.000	9.50	5.918	.990	.003
.020	9.291	119.70	5.580	-.80	5.579	-.078	.025
.041	9.157	109.10	5.500	-11.40	5.391	-1.087	.050
.082	8.758	89.50	5.260	-31.00	4.509	-2.709	.100
.122	8.558	68.30	5.140	-52.20	3.150	-4.061	.150
.163	8.392	46.60	5.040	-73.90	1.398	-4.842	.200
.204	8.491	25.80	5.100	-94.70	-.418	-5.083	.250
.245	8.558	6.00	5.140	-114.50	-2.132	-4.677	.300
.286	8.392	-12.70	5.040	-133.20	-3.450	-3.674	.350
.326	8.059	-31.70	4.840	-151.70	-4.262	-2.295	.400
.367	7.592	-50.40	4.560	-170.50	-4.497	-.753	.450
.408	7.259	-70.50	4.360	-191.00	-4.280	.832	.500
.449	6.793	-91.30	4.080	-211.80	-3.468	2.150	.550
.490	6.760	-113.00	4.060	-233.50	-2.415	3.264	.600
.530	6.560	-134.30	3.940	-254.80	-1.033	3.802	.650
.571	6.693	-155.20	4.020	-275.70	.399	4.000	.700
.612	6.793	-174.80	4.080	-295.30	1.744	3.689	.750
.653	6.560	-193.30	3.940	-313.80	2.727	2.844	.800
.694	6.394	-211.40	3.840	-331.90	3.387	1.809	.850
.734	5.994	-229.90	3.600	-350.40	3.550	.600	.900
.775	5.861	-249.50	3.520	-370.00	3.467	-.611	.950
.803	5.561	-271.20	3.340	-391.70	2.842	-1.755	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	9.862	-3.00	27.020	-3.00	26.983	-1.414	.006
.020	8.118	-11.50	22.240	-11.50	21.794	-4.434	.025
.041	7.789	-21.30	21.340	-21.30	19.882	-7.752	.050
.082	7.570	-40.90	20.740	-40.90	15.676	-13.579	.100
.122	7.475	-59.50	20.480	-59.50	10.394	-17.646	.150
.163	7.227	-78.70	19.800	-78.70	3.880	-19.416	.200
.204	6.679	-98.80	18.300	-98.80	-2.800	-18.085	.250
.245	6.380	-119.50	17.480	-119.50	-8.608	-15.214	.300
.286	6.329	-141.60	17.340	-141.60	-13.589	-10.771	.350
.326	6.227	-163.00	17.060	-163.00	-16.315	-4.988	.400
.367	6.176	-184.00	16.920	-184.00	-16.879	1.180	.450
.408	6.081	-203.50	16.660	-203.50	-15.278	6.643	.500
.449	6.081	-222.40	16.660	-222.40	-12.303	11.234	.550
.490	6.030	-241.00	16.520	-241.00	-8.009	14.449	.600
.530	5.482	-260.20	15.020	-260.20	-2.557	14.801	.650
.571	5.431	-280.30	14.880	-280.30	2.661	14.640	.700
.612	4.986	-301.50	13.660	-301.50	7.137	11.647	.750
.653	4.935	-322.70	13.520	-322.70	10.755	8.193	.800
.694	4.935	-345.10	13.520	-345.10	13.065	3.476	.850
.734	4.935	-365.60	13.520	-365.60	13.455	-1.319	.900
.775	5.380	-385.80	14.740	-385.80	13.271	-6.415	.950
.805	5.782	-398.30	15.840	-398.30	12.431	-9.817	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0660 BETAL/BETAC = 1.109 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .010 RL = 180.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	9.992	130.00	5.460	8.00	5.407	.760	.003
.034	9.736	119.20	5.320	-2.80	5.314	-.260	.025
.069	9.553	108.10	5.220	-13.90	5.067	-1.254	.050
.138	9.296	87.00	5.080	-35.00	4.161	-2.914	.100
.207	9.479	66.50	5.180	-55.50	2.934	-4.269	.150
.276	9.479	46.20	5.180	-75.80	1.271	-5.022	.200
.345	9.479	26.80	5.180	-95.20	-.469	-5.159	.250
.414	9.040	8.30	4.940	-113.70	-1.986	-4.523	.300
.482	8.784	-10.00	4.800	-132.00	-3.212	-3.567	.350
.551	4.235	-30.90	4.800	-152.90	-4.006	-2.050	.400
.620	8.049	-51.00	4.420	-173.00	-4.387	-.539	.450
.667	7.795	-66.90	4.260	-188.90	-4.209	.659	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	8.981	-1.90	25.660	-1.90	25.646	-.851	.006
.034	7.532	-10.00	21.520	-10.00	21.193	-3.737	.025
.069	7.084	-19.80	20.240	-19.80	19.079	-6.756	.050
.138	6.783	-38.80	19.340	-38.80	15.104	-12.144	.100
.207	6.531	-57.80	18.660	-57.80	9.943	-15.790	.150
.276	6.335	-78.60	18.100	-78.60	3.578	-17.743	.200
.345	5.789	-100.30	16.540	-100.30	-2.957	-16.273	.250
.414	5.789	-122.30	16.540	-122.30	-8.838	-13.981	.300
.482	6.034	-143.50	17.240	-143.50	-13.858	-10.255	.350
.551	5.887	-163.50	16.820	-163.50	-16.127	-4.777	.400
.620	6.083	-182.80	17.340	-182.80	-17.359	.849	.450
.671	6.587	-195.90	18.820	-195.90	-18.100	5.156	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0407   BETAL/BETAC = 1.047   L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ   PE = 2.885   D/LAMDAC = .020   RL = 204.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	10.078	140.00	4.940	10.00	4.865	.858	.003
.014	9.914	129.50	4.860	-.50	4.860	-.042	.025
.029	9.833	119.10	4.820	-10.90	4.733	-.911	.050
.058	9.67[illegible]	100.10	4.740	-29.90	4.109	-2.363	.100
.086	9.466	80.40	4.640	-45.60	3.007	-3.534	.150
.115	9.384	60.90	4.600	-69.10	1.641	-4.297	.200
.144	9.302	41.60	4.560	-88.40	.127	-4.558	.250
.173	9.139	22.60	4.480	-107.20	-1.325	-4.280	.300
.201	9.139	4.30	4.480	-125.70	-2.614	-3.638	.350
.230	9.058	-14.70	4.440	-144.70	-3.624	-2.566	.400
.259	8.813	-32.80	4.320	-162.80	-4.127	-1.277	.450
.288	8.854	-52.00	4.340	-182.00	-4.337	.151	.500
.316	8.446	-71.50	4.140	-201.50	-3.852	1.517	.550
.345	8.323	-90.80	4.080	-220.80	-3.089	2.666	.600
.374	8.282	-110.30	4.060	-240.30	-2.012	3.527	.650
.403	8.078	-129.70	3.960	-259.70	-.708	3.896	.700
.431	7.997	-149.30	3.920	-275.30	.633	3.868	.750
.460	7.956	-168.00	3.900	-298.00	1.831	3.444	.800
.489	7.997	-186.20	3.920	-316.20	2.829	2.713	.850
.518	7.752	-204.70	3.800	-334.70	3.436	1.624	.900
.546	7.466	-223.20	3.660	-353.20	3.634	.433	.950
.575	7.140	-243.10	3.500	-373.10	3.409	-.793	1.000
.604	7.099	-261.30	3.480	-391.30	2.974	-1.808	1.050
.633	7.018	-281.80	3.440	-411.80	2.127	-2.703	1.100
.661	7.099	-301.80	3.480	-431.80	1.087	-3.306	1.150
.690	7.018	-320.70	3.440	-450.70	-.042	-3.440	1.200
.719	7.099	-340.00	3.480	-470.00	-1.190	-3.270	1.250
.748	6.814	-358.50	3.340	-488.50	-2.079	-2.614	1.300
.776	6.773	-376.40	3.320	-506.40	-2.765	-1.837	1.350
.805	6.569	-395.20	3.220	-525.20	-3.113	-.823	1.400
.834	6.487	-414.60	3.180	-544.60	-3.170	.255	1.450
.853	6.365	-429.60	3.120	-555.60	-2.939	1.047	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	9.704	3.00	23.960	3.00	23.927	1.254	.006
.014	7.654	-4.80	18.900	-4.80	18.834	-1.582	.025
.029	7.104	-14.40	17.540	-14.40	16.989	-4.362	.050
.058	6.853	-33.40	16.920	-33.40	14.126	-9.314	.100
.086	6.601	-52.10	16.300	-52.10	10.013	-12.862	.150
.115	6.504	-71.30	16.060	-71.30	5.149	-15.212	.200
.144	6.399	-90.30	15.800	-90.30	-.083	-15.800	.250
.173	6.156	-109.40	15.200	-109.40	-5.049	-14.337	.300
.201	6.205	-128.30	15.320	-128.30	-9.495	-12.023	.350
.230	6.302	-147.60	15.560	-147.60	-13.138	-8.337	.400
.259	6.156	-166.40	15.200	-166.40	-14.774	-3.574	.450
.288	6.002	-185.20	14.820	-185.20	-14.759	1.343	.500
.316	5.905	-204.00	14.580	-204.00	-13.319	5.930	.550
.345	5.800	-222.60	14.320	-222.60	-10.541	9.693	.600
.374	5.654	-242.10	13.960	-242.10	-6.532	12.337	.650
.403	5.702	-262.50	14.080	-262.50	-1.838	13.960	.700
.431	5.500	-280.80	13.580	-280.80	2.545	13.339	.750
.460	5.354	-300.00	13.220	-300.00	6.610	11.449	.800
.489	5.403	-321.00	13.340	-321.00	10.367	8.395	.850
.518	5.249	-338.60	12.960	-338.60	12.066	4.729	.900
.546	5.152	-358.50	12.720	-358.50	12.716	.333	.950
.575	5.054	-377.00	12.480	-377.00	11.935	-3.649	1.000
.604	5.006	-395.60	12.360	-395.60	10.050	-7.195	1.050
.633	5.006	-414.00	12.360	-414.00	7.265	-9.999	1.100
.661	4.900	-433.00	12.100	-433.00	3.538	-11.571	1.150
.690	4.755	-452.00	11.740	-452.00	-.410	-11.733	1.200
.719	4.601	-470.90	11.360	-470.90	-4.053	-10.613	1.250
.748	4.552	-490.30	11.240	-490.30	-7.270	-8.572	1.300
.776	4.552	-510.40	11.240	-510.40	-9.773	-5.552	1.350
.805	4.649	-530.80	11.480	-530.80	-11.332	-1.835	1.400
.834	4.698	-549.60	11.600	-549.60	-11.438	1.935	1.450
.855	5.403	-564.30	13.340	-564.30	-12.158	5.490	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0407 BETAL/BETAC = 1.047 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .020 RL = 195.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	10.010	130.00	5.200	5.00	5.180	.453	.003
.020	9.702	119.20	5.040	-5.80	5.014	-.509	.025
.040	9.625	109.90	5.000	-15.10	4.827	-1.303	.050
.081	9.317	91.10	4.840	-33.90	4.017	-2.699	.100
.121	9.125	71.50	4.740	-53.50	2.819	-3.810	.150
.161	8.817	51.60	4.580	-73.40	1.308	-4.389	.200
.202	8.701	31.40	4.520	-93.60	-.284	-4.511	.250
.242	8.701	11.80	4.520	-113.20	-1.781	-4.154	.300
.283	8.817	-7.50	4.580	-132.50	-3.094	-3.377	.350
.323	8.778	-26.00	4.560	-151.00	-3.988	-2.211	.400
.363	8.701	-43.80	4.520	-168.80	-4.434	-.878	.450
.404	8.509	-62.20	4.[illegible]20	-187.20	-4.385	.554	.500
.444	8.316	-80.80	4.320	-205.80	-3.889	1.880	.550
.484	8.008	-99.70	4.160	-224.70	-2.957	2.926	.600
.525	7.661	-119.50	3.980	-244.50	-1.713	3.592	.650
.565	7.661	-140.50	3.980	-265.50	-.312	3.968	.700
.605	7.623	-160.60	3.960	-285.60	1.065	3.814	.750
.646	7.546	-179.60	3.920	-304.60	2.226	3.227	.800
.686	7.700	-197.50	4.000	-322.90	3.190	2.413	.850
.727	7.623	-216.30	3.960	-341.30	3.751	1.270	.900
.767	7.661	-234.30	3.980	-355.30	3.980	.049	.950
.794	7.507	-247.60	3.900	-372.60	3.806	-.851	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	9.009	-1.80	23.400	-1.80	23.388	-.735	.006
.020	7.061	-10.40	18.340	-10.40	18.039	-3.311	.025
.040	6.707	-20.30	17.420	-20.30	16.338	-6.044	.050
.081	6.560	-39.90	17.040	-35.90	13.072	-10.930	.100
.121	6.506	-58.30	16.900	-58.30	8.880	-14.379	.150
.161	6.560	-76.90	17.040	-76.90	3.862	-16.597	.200
.202	6.360	-95.30	16.520	-95.30	-1.526	-16.449	.250
.242	6.206	-113.20	16.120	-113.20	-6.350	-14.816	.300
.283	6.160	-132.20	16.000	-132.20	-10.748	-11.853	.350
.323	5.860	-151.80	15.220	-151.80	-13.413	-7.192	.400
.363	5.706	-171.70	14.820	-171.70	-14.665	-2.139	.450
.404	5.559	-191.70	14.440	-191.70	-14.140	2.928	.500
.444	5.660	-211.70	14.700	-211.70	-12.507	7.724	.550
.484	5.706	-230.70	14.820	-230.70	-9.387	11.468	.600
.525	5.806	-250.70	15.080	-250.70	-4.984	14.233	.650
.565	5.760	-267.20	14.960	-267.20	-.731	14.942	.700
.605	5.305	-285.20	13.780	-285.20	3.613	13.298	.750
.646	5.205	-303.80	13.520	-303.80	7.521	11.235	.800
.686	5.159	-323.50	13.400	-323.50	10.772	7.971	.850
.727	5.005	-344.20	13.000	-344.20	12.509	3.540	.900
.767	5.205	-364.90	13.520	-364.90	13.471	-1.155	.950
.797	6.006	-379.50	15.600	-379.50	14.705	-5.207	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0407 BETAL/BETAC = 1.047 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .020 RL = 195.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	10.000	130.00	5.000	5.00	4.981	.436	.003
.034	9.800	119.80	4.900	-5.20	4.880	-.444	.025
.068	9.800	109.60	4.900	-15.40	4.724	-1.301	.050
.135	9.560	90.10	4.780	-34.90	3.920	-2.735	.100
.203	9.640	70.20	4.820	-54.80	2.778	-3.939	.150
.271	9.560	51.30	4.780	-73.70	1.342	-4.588	.200
.338	9.640	31.70	4.820	-93.30	-.277	-4.812	.250
.406	9.320	13.00	4.660	-112.00	-1.746	-4.321	.300
.474	9.320	-5.60	4.660	-130.60	-3.033	-3.538	.350
.541	9.120	-24.10	4.560	-145.10	-3.913	-2.342	.400
.609	9.120	-43.20	4.560	-168.20	-4.464	-.933	.450
.655	8.800	-58.40	4.400	-183.40	-4.392	.261	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	9.304	-5.20	23.260	-5.20	23.164	-2.108	.006
.034	7.800	-12.30	19.500	-12.30	19.052	-4.154	.025
.068	7.128	-21.90	17.820	-21.90	16.534	-6.647	.050
.135	6.824	-41.00	17.060	-41.00	12.875	-11.192	.100
.203	6.648	-59.30	16.620	-59.30	8.485	-14.291	.150
.271	6.752	-78.30	16.880	-78.30	3.423	-16.529	.200
.338	6.352	-97.70	15.880	-97.70	-2.128	-15.737	.250
.406	6.304	-116.80	15.760	-116.80	-7.106	-14.067	.300
.474	6.352	-136.30	15.880	-136.30	-11.481	-10.971	.350
.541	6.200	-156.00	15.500	-156.00	-14.160	-6.304	.400
.609	6.552	-176.20	16.380	-176.20	-16.344	-1.086	.450
.659	7.600	-190.90	19.000	-190.90	-18.657	3.593	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0220 BETAL/BETAC = 1.025 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .050 RL = 265.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.321	126.70	3.820	6.70	3.794	.446	.003
.014	9.126	114.70	3.740	-5.30	3.724	-.345	.025
.029	8.930	103.30	3.660	-16.70	3.506	-1.052	.050
.057	8.735	83.80	3.580	-36.20	2.889	-2.114	.100
.086	8.665	64.10	3.560	-55.90	1.996	-2.948	.150
.115	8.686	44.50	3.560	-75.50	.891	-3.447	.200
.143	8.784	25.60	3.600	-94.40	-.276	-3.589	.250
.172	8.784	7.40	3.600	-112.60	-1.383	-3.324	.300
.201	8.930	-10.00	3.660	-130.00	-2.353	-2.804	.350
.229	8.979	-27.50	3.680	-147.50	-3.104	-1.977	.400
.258	8.833	-45.40	3.620	-165.40	-3.503	-.912	.450
.287	8.686	-63.40	3.560	-183.40	-3.554	.211	.500
.315	8.345	-82.20	3.420	-202.20	-3.166	1.292	.550
.344	8.101	-101.70	3.320	-221.70	-2.479	2.209	.600
.373	8.052	-121.60	3.300	-241.60	-1.570	2.903	.650
.401	8.052	-140.90	3.300	-260.90	-.522	3.258	.700
.430	8.198	-159.40	3.360	-279.40	.549	3.315	.750
.459	8.296	-177.30	3.400	-297.30	1.559	3.021	.800
.487	8.394	-194.60	3.440	-314.60	2.415	2.449	.850
.516	8.247	-212.00	3.380	-332.00	2.984	1.587	.900
.545	8.052	-229.80	3.300	-345.80	3.248	.584	.950
.573	7.710	-248.20	3.160	-368.20	3.128	-.451	1.000
.602	7.662	-266.70	3.140	-386.70	2.805	-1.411	1.050
.631	7.613	-287.80	3.120	-407.80	2.096	-2.311	1.100
.659	7.759	-307.40	3.180	-427.40	1.222	-2.936	1.150
.688	7.906	-325.50	3.240	-445.50	.254	-3.230	1.200
.717	8.101	-343.50	3.320	-463.50	-.775	-3.228	1.250
.745	7.906	-360.60	3.240	-480.60	-1.649	-2.789	1.300
.774	7.906	-377.20	3.240	-497.20	-2.377	-2.201	1.350
.803	7.613	-394.70	3.120	-514.70	-2.821	-1.333	1.400
.831	7.515	-413.20	3.080	-533.20	-3.058	-.365	1.450
.851	7.222	-429.20	2.960	-545.20	-2.922	.473	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	10.011	-5.00	21.300	-5.00	21.219	-1.856	.006
.014	7.529	-12.00	16.020	-12.00	15.670	-3.331	.025
.029	6.712	-21.20	14.260	-21.20	13.314	-5.164	.050
.057	6.354	-39.30	13.520	-39.30	10.462	-8.563	.100
.086	6.157	-57.00	13.100	-57.00	7.135	-10.987	.150
.115	6.007	-75.50	12.780	-75.50	3.200	-12.373	.200
.143	5.960	-93.80	12.680	-93.80	-.840	-12.652	.250
.172	5.687	-112.50	12.100	-112.50	-4.630	-11.179	.300
.201	5.706	-131.80	12.140	-131.80	-8.092	-9.050	.350
.229	5.856	-151.20	12.460	-151.20	-10.919	-6.003	.400
.258	5.753	-169.90	12.240	-169.90	-12.050	-2.146	.450
.287	5.706	-188.30	12.140	-188.30	-12.013	1.752	.500
.315	5.753	-206.40	12.240	-206.40	-10.964	5.442	.550
.344	5.753	-224.20	12.240	-224.20	-8.775	8.533	.600
.373	5.602	-242.00	11.920	-242.00	-5.596	10.525	.650
.401	5.659	-260.30	12.040	-260.30	-2.029	11.868	.700
.430	5.555	-278.50	11.820	-278.50	1.747	11.690	.750
.459	5.405	-297.20	11.500	-257.20	5.257	10.228	.800
.487	5.452	-316.60	11.600	-316.60	8.428	7.970	.850
.516	5.405	-335.80	11.500	-335.80	10.489	4.714	.900
.545	5.358	-354.70	11.400	-354.70	11.351	1.053	.950
.573	5.330	-372.40	11.340	-372.40	11.075	-2.435	1.000
.602	5.405	-390.20	11.500	-390.20	9.939	-5.785	1.050
.631	5.255	-407.00	11.160	-407.00	7.625	-8.177	1.100
.659	5.283	-424.80	11.240	-424.80	4.786	-10.170	1.150
.688	5.104	-443.10	10.860	-443.10	1.305	-10.781	1.200
.717	4.954	-462.40	10.540	-462.40	-2.263	-10.294	1.250
.745	4.954	-481.90	10.540	-481.90	-5.570	-8.948	1.300
.774	5.057	-502.30	10.760	-502.30	-8.514	-6.580	1.350
.803	5.123	-522.00	10.900	-522.00	-10.367	-3.368	1.400
.831	5.659	-541.50	12.040	-541.50	-12.036	.315	1.450
.853	7.012	-555.00	14.920	-555.00	-14.412	3.862	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0220 BETAL/BETAC = 1.025 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.865 D/LAMDAO = .050 RL = 225.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.990	122.50	4.260	4.50	4.247	.334	.003
.020	9.568	111.10	4.080	-6.50	4.050	-.490	.025
.040	9.521	100.60	4.060	-17.40	3.874	-1.214	.050
.080	9.333	82.70	3.980	-35.30	3.248	-2.300	.100
.121	9.145	63.70	3.900	-54.30	2.276	-3.167	.150
.161	8.864	45.10	3.780	-72.50	1.111	-3.613	.200
.201	8.677	25.40	3.700	-92.60	-.168	-3.696	.250
.241	8.677	5.80	3.700	-112.20	-1.398	-3.426	.300
.281	8.864	-14.00	3.780	-132.00	-2.529	-2.809	.350
.322	8.911	-33.20	3.800	-151.20	-3.330	-1.831	.400
.362	9.005	-51.10	3.840	-169.10	-3.771	-.726	.450
.402	9.052	-68.40	3.860	-186.40	-3.836	.430	.500
.442	9.005	-86.40	3.840	-204.40	-3.497	1.586	.550
.482	8.864	-103.30	3.780	-221.30	-2.840	2.495	.600
.523	8.723	-121.30	3.720	-235.30	-1.899	3.199	.650
.563	8.442	-139.80	3.600	-257.80	-.761	3.519	.700
.603	8.348	-159.80	3.560	-277.80	.483	3.527	.750
.643	7.973	-179.60	3.400	-297.60	1.575	3.013	.800
.683	8.114	-198.70	3.460	-316.70	2.518	2.373	.850
.724	8.161	-218.30	3.480	-336.30	3.187	1.399	.900
.764	8.536	-237.00	3.640	-355.00	3.626	.317	.950
.791	8.536	-250.80	3.640	-368.80	3.597	-.557	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	CRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.005	10.011	-3.00	21.300	-3.00	21.271	-1.115	.006
.020	7.407	-10.70	15.760	-10.70	15.486	-2.926	.025
.040	6.683	-20.40	14.220	-20.40	13.328	-4.957	.050
.080	6.307	-40.20	13.420	-40.20	10.250	-8.662	.100
.121	6.260	-60.00	13.320	-60.00	6.660	-11.535	.150
.161	6.411	-78.40	13.640	-78.40	2.743	-13.361	.200
.201	6.411	-96.00	13.640	-96.00	-1.426	-13.565	.250
.241	6.354	-113.20	13.520	-113.20	-5.326	-12.427	.300
.281	6.354	-130.70	13.520	-130.70	-8.816	-10.250	.350
.322	6.110	-149.00	13.000	-149.00	-11.143	-6.695	.400
.362	5.903	-167.50	12.560	-167.50	-12.262	-2.718	.450
.402	5.809	-186.80	12.360	-186.80	-12.273	1.463	.500
.442	5.706	-206.90	12.140	-206.90	-10.826	5.493	.550
.482	5.706	-226.50	12.140	-226.50	-8.357	8.806	.600
.523	5.809	-245.50	12.360	-245.50	-5.126	11.247	.650
.563	5.828	-263.80	12.400	-263.80	-1.339	12.327	.700
.603	5.856	-281.00	12.460	-281.00	2.377	12.231	.750
.643	5.903	-298.00	12.560	-298.00	5.897	11.090	.800
.683	5.960	-315.50	12.680	-315.50	9.044	8.888	.850
.724	5.706	-333.70	12.140	-333.70	10.883	5.379	.900
.764	6.007	-353.80	12.780	-353.80	12.705	1.380	.950
.793	7.210	-365.00	15.340	-365.00	15.151	-2.400	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0220 BETAL/BETAC = 1.025 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.865 D/LAMDAO = .050 RL = 225.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	9.010	130.00	4.240	4.00	4.230	.296	.003
.034	8.840	118.70	4.160	-7.30	4.126	-.529	.025
.067	8.840	108.60	4.160	-17.40	3.970	-1.244	.050
.134	8.627	90.70	4.060	-35.30	3.314	-2.346	.100
.202	8.585	72.30	4.040	-53.70	2.392	-3.256	.150
.269	8.287	53.80	3.900	-72.20	1.192	-3.713	.200
.336	8.075	33.60	3.800	-92.40	-.159	-3.797	.250
.403	7.777	13.70	3.660	-112.30	-1.389	-3.386	.300
.470	7.905	-5.70	3.720	-131.70	-2.475	-2.777	.350
.538	7.905	-25.40	3.720	-151.40	-3.266	-1.781	.400
.605	8.287	-43.80	3.900	-169.80	-3.838	-.691	.450
.651	8.330	-58.40	3.920	-184.40	-3.908	.301	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	GRMAG	CRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
.008	8.993	-3.00	21.160	-3.00	21.131	-1.107	.006
.034	6.689	-10.70	15.740	-10.70	15.466	-2.922	.025
.067	5.993	-20.40	14.100	-20.40	13.216	-4.915	.050
.134	5.644	-40.20	13.280	-40.20	10.143	-8.572	.100
.202	5.542	-60.00	13.040	-60.00	6.520	-11.293	.150
.269	5.839	-78.40	13.740	-78.40	2.763	-13.459	.200
.336	5.593	-96.00	13.160	-96.00	-1.376	-13.088	.250
.403	5.593	-113.20	13.160	-113.20	-5.184	-12.096	.300
.470	5.644	-130.70	13.280	-130.70	-8.660	-10.066	.350
.538	5.440	-149.00	12.800	-149.00	-10.972	-6.592	.400
.605	5.746	-167.50	13.820	-167.50	-13.200	-2.926	.450
.655	6.791	-186.80	15.980	-186.80	-15.868	1.892	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0190 BETAL/BETAC = 1.023 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .100 RL = 310.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	RAW DATA IRMAG	IRFAZ	NORMALIZED DATA INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	8.755	131.30	3.420	11.30	3.354	.670	.003
.014	8.499	118.30	3.320	-1.70	3.319	-.098	.025
.029	8.141	106.90	3.180	-13.10	3.097	-.721	.050
.057	7.936	86.50	3.100	-33.50	2.585	-1.711	.100
.086	7.782	67.30	3.040	-52.70	1.842	-2.418	.150
.115	7.885	47.30	3.080	-72.70	.916	-2.941	.200
.143	7.885	27.90	3.080	-92.10	-.113	-3.078	.250
.172	7.834	9.90	3.060	-110.10	-1.052	-2.874	.300
.201	8.038	-8.50	3.140	-128.50	-1.955	-2.457	.350
.229	8.192	-26.30	3.200	-146.30	-2.662	-1.776	.400
.258	7.987	-43.90	3.120	-163.90	-2.998	-.865	.450
.287	7.885	-62.20	3.080	-182.20	-3.078	.118	.500
.315	7.526	-80.70	2.940	-200.70	-2.750	1.039	.550
.344	7.424	-99.50	2.900	-219.50	-2.238	1.845	.600
.373	7.424	-118.40	2.900	-238.40	-1.520	2.470	.650
.401	7.424	-137.30	2.900	-257.30	-.638	2.829	.700
.430	7.578	-155.30	2.960	-275.30	.273	2.947	.750
.459	7.578	-173.00	2.960	-293.00	1.157	2.725	.800
.487	7.629	-191.00	2.980	-311.00	1.955	2.249	.850
.516	7.578	-208.60	2.960	-328.60	2.527	1.542	.900
.545	7.322	-226.70	2.860	-346.70	2.783	.658	.950
.573	7.219	-245.60	2.820	-365.60	2.807	-.275	1.000
.602	7.270	-264.10	2.840	-384.10	2.592	-1.160	1.050
.631	7.168	-282.70	2.800	-402.70	2.058	-1.899	1.100
.659	7.424	-301.90	2.900	-421.90	1.366	-2.558	1.150
.688	7.475	-319.90	2.920	-439.90	.512	-2.875	1.200
.717	7.629	-337.70	2.980	-457.70	-.399	-2.953	1.250
.745	7.526	-354.90	2.940	-474.90	-1.238	-2.667	1.300
.774	7.373	-372.00	2.880	-492.00	-1.927	-2.140	1.350
.803	7.066	-390.20	2.760	-510.20	-2.395	-1.372	1.400
.831	7.014	-409.60	2.740	-529.60	-2.695	-.495	1.450
.851	6.810	-426.30	2.660	-546.30	-2.644	.292	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

Z/H	RAW DATA QRMAG	QRFAZ	NORMALIZED DATA QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	10.048	-5.00	20.300	-5.00	20.223	-1.769	.006
.014	7.356	-11.50	14.860	-11.50	14.562	-2.963	.025
.029	6.435	-20.10	13.000	-20.10	12.208	-4.468	.050
.057	5.881	-37.50	11.880	-37.50	9.425	-7.232	.100
.086	5.574	-55.50	11.260	-55.50	6.378	-9.280	.150
.115	5.376	-74.40	10.860	-74.40	2.920	-10.460	.200
.143	5.346	-92.50	10.800	-92.50	-.471	-10.790	.250
.172	5.178	-111.10	10.460	-111.10	-3.766	-9.759	.300
.201	5.247	-130.40	10.600	-130.40	-6.870	-8.072	.350
.229	5.247	-148.60	10.600	-148.60	-9.048	-5.523	.400
.258	5.277	-166.60	10.660	-166.60	-10.370	-2.470	.450
.287	5.178	-185.30	10.460	-185.30	-10.415	.966	.500
.315	5.148	-203.10	10.400	-203.10	-9.566	4.080	.550
.344	5.148	-221.00	10.400	-221.00	-7.849	6.823	.600
.373	5.079	-238.80	10.260	-238.80	-5.315	8.776	.650
.401	5.148	-257.50	10.400	-257.50	-2.251	10.153	.700
.430	5.079	-275.70	10.260	-275.70	1.019	10.209	.750
.459	5.029	-294.10	10.160	-294.10	4.149	9.274	.800
.487	5.079	-313.00	10.260	-313.00	6.997	7.504	.850
.516	5.029	-331.50	10.160	-331.50	8.929	4.848	.900
.545	4.920	-349.90	9.940	-349.90	9.786	1.743	.950
.573	4.920	-367.50	9.940	-367.50	9.855	-1.297	1.000
.602	4.970	-385.10	10.040	-385.10	9.092	-4.259	1.050
.631	4.940	-410.30	9.980	-410.30	6.375	-7.679	1.100
.659	4.871	-420.60	9.840	-420.60	4.830	-8.573	1.150
.688	4.772	-439.50	9.640	-439.50	1.757	-9.479	1.200
.717	4.673	-457.90	9.440	-457.90	-1.297	-9.350	1.250
.745	4.722	-477.50	9.540	-477.50	-4.405	-8.462	1.300
.774	4.920	-497.40	9.940	-497.40	-7.317	-6.728	1.350
.803	4.999	-516.80	10.100	-516.80	-9.283	-3.979	1.400
.831	5.623	-536.00	11.360	-536.00	-11.332	-.792	1.450
.852	7.039	-549.70	14.220	-549.70	-14.017	2.396	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0190 BETAL/BETAC = 1.023 L1/LAMDAC = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .100 RL = 310.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.046	132.30	3.520	12.30	3.439	.750	.003
.020	6.430	119.40	3.280	-.60	3.280	-.034	.025
.040	6.275	107.80	3.220	-12.20	3.147	-.680	.050
.080	6.018	86.30	3.120	-33.70	2.596	-1.731	.100
.121	6.018	66.10	3.120	-53.90	1.838	-2.521	.150
.161	6.018	46.80	3.120	-73.20	.902	-2.987	.200
.201	6.173	28.10	3.180	-91.90	-.105	-3.178	.250
.241	6.224	10.10	3.200	-109.90	-1.089	-3.009	.300
.281	6.327	-7.90	3.240	-127.90	-1.990	-2.557	.350
.321	6.121	-25.50	3.160	-145.50	-2.604	-1.790	.400
.362	7.916	-42.80	3.080	-162.80	-2.942	-.911	.450
.402	7.761	-62.50	3.020	-182.50	-3.017	.132	.500
.442	7.710	-81.40	3.000	-201.40	-2.793	1.095	.550
.482	7.710	-100.40	3.000	-220.40	-2.285	1.944	.600
.522	7.864	-119.50	3.060	-235.50	-1.553	2.637	.650
.563	6.018	-137.70	3.120	-257.70	-.665	3.048	.700
.603	6.121	-155.50	3.160	-275.50	.303	3.145	.750
.643	7.813	-172.70	3.040	-292.70	1.173	2.805	.800
.683	7.813	-190.00	3.040	-310.00	1.954	2.329	.850
.723	7.504	-208.40	2.920	-328.40	2.487	1.530	.900
.763	7.453	-228.20	2.900	-348.20	2.839	.593	.950
.791	7.196	-244.50	2.800	-364.50	2.791	-.220	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	10.000	-5.00	20.000	-5.00	19.924	-1.743	.006
.020	7.350	-11.40	14.700	-11.40	14.410	-2.906	.025
.040	6.500	-19.70	13.000	-19.70	12.239	-4.382	.050
.080	5.850	-37.10	11.700	-37.10	9.332	-7.058	.100
.121	5.500	-54.60	11.000	-54.60	6.372	-8.966	.150
.161	5.400	-73.60	10.800	-73.60	3.049	-10.361	.200
.201	5.250	-92.80	10.500	-92.80	-.513	-10.487	.250
.241	5.220	-112.00	10.440	-112.00	-3.911	-9.680	.300
.281	5.320	-131.00	10.640	-131.00	-6.980	-8.030	.350
.321	5.300	-149.80	10.600	-149.80	-9.161	-5.332	.400
.362	5.200	-167.70	10.400	-167.70	-10.161	-2.216	.450
.402	5.150	-185.50	10.300	-185.50	-10.253	.987	.500
.442	5.200	-203.50	10.400	-203.50	-9.537	4.147	.550
.482	5.150	-221.30	10.300	-221.30	-7.738	6.798	.600
.522	5.050	-239.30	10.100	-235.30	-5.156	8.684	.650
.563	4.900	-258.30	9.800	-258.30	-1.987	9.596	.700
.603	4.800	-277.10	9.600	-277.10	1.187	9.526	.750
.643	4.800	-296.40	9.600	-256.40	4.268	8.599	.800
.683	5.000	-316.50	10.000	-316.50	7.254	6.884	.850
.723	5.100	-335.50	10.200	-335.50	9.282	4.230	.900
.763	5.750	-355.00	11.500	-355.00	11.456	1.002	.950
.793	7.200	-368.50	14.400	-368.50	14.242	-2.128	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0190 BETAL/BETAC = 1.023 L1/LAMDAC = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .100 RL = 310.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	6.642	131.70	3.520	5.70	3.470	.593	.003
.034	6.003	118.30	3.260	-3.70	3.253	-.210	.025
.067	6.003	106.90	3.260	-15.10	3.147	-.849	.050
.134	7.807	85.90	3.180	-36.10	2.569	-1.874	.100
.202	7.905	66.20	3.220	-55.80	1.810	-2.663	.150
.269	6.003	47.80	3.260	-74.20	.888	-3.137	.200
.336	8.052	29.30	3.280	-92.70	-.155	-3.276	.250
.403	7.807	12.10	3.180	-109.90	-1.082	-2.990	.300
.470	7.758	-5.40	3.160	-127.40	-1.919	-2.510	.350
.537	7.365	-24.20	3.000	-146.20	-2.493	-1.669	.400
.605	7.316	-44.00	2.980	-166.00	-2.891	-.721	.450
.650	7.070	-61.00	2.880	-183.00	-2.876	.151	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	10.045	-5.00	20.500	-5.00	20.422	-1.787	.006
.034	7.281	-10.60	14.860	-10.60	14.606	-2.734	.025
.067	6.429	-19.00	13.120	-15.00	12.405	-4.271	.050
.134	5.674	-36.40	11.580	-36.40	9.321	-6.872	.100
.202	5.272	-54.30	10.760	-54.30	6.279	-8.738	.150
.269	5.174	-73.50	10.560	-73.50	2.999	-10.125	.200
.336	4.920	-93.20	10.040	-93.20	-.560	-10.024	.250
.403	4.969	-112.50	10.140	-112.50	-3.880	-9.368	.300
.470	5.076	-132.40	10.360	-132.40	-6.986	-7.650	.350
.537	5.174	-151.90	10.560	-151.90	-9.315	-4.974	.400
.605	5.831	-171.20	11.900	-171.20	-11.760	-1.821	.450
.654	7.232	-185.10	14.760	-185.10	-14.702	1.312	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0340 BETAL/BETAC = 1.016 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .250 RL = 385.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.254	137.40	3.180	10.20	3.130	.563	.003
.014	8.614	125.50	2.960	-1.70	2.959	-.088	.025
.029	8.264	113.90	2.840	-13.30	2.764	-.653	.050
.057	7.741	93.30	2.660	-33.90	2.208	-1.484	.100
.086	7.450	72.80	2.560	-54.40	1.490	-2.082	.150
.115	7.450	52.80	2.560	-74.40	.688	-2.466	.200
.143	7.391	34.00	2.540	-93.20	-.142	-2.536	.250
.172	7.333	16.20	2.520	-111.00	-.903	-2.353	.300
.200	7.566	-2.10	2.600	-125.30	-1.647	-2.012	.350
.229	7.508	-20.10	2.580	-147.30	-2.171	-1.394	.400
.258	7.275	-28.40	2.500	-155.60	-2.277	-1.033	.450
.286	6.984	-56.60	2.400	-184.00	-2.394	.167	.500
.315	6.693	-76.60	2.300	-203.80	-2.104	.928	.550
.344	6.635	-96.20	2.280	-223.40	-1.657	1.567	.600
.372	6.693	-115.40	2.300	-242.60	-1.058	2.042	.650
.401	6.693	-134.10	2.300	-261.30	-.348	2.274	.700
.430	6.868	-151.80	2.360	-279.00	.369	2.331	.750
.458	6.926	-168.80	2.380	-296.00	1.043	2.139	.800
.487	6.984	-186.30	2.400	-313.50	1.652	1.741	.850
.515	6.809	-203.80	2.340	-331.00	2.047	1.134	.900
.544	6.635	-222.00	2.280	-345.20	2.240	.427	.950
.573	6.460	-241.30	2.220	-368.50	2.196	-.328	1.000
.601	6.402	-261.40	2.200	-388.60	1.932	-1.053	1.050
.630	6.577	-279.80	2.260	-407.00	1.541	-1.653	1.100
.659	6.809	-298.70	2.340	-425.90	.956	-2.136	1.150
.687	7.042	-316.30	2.420	-443.50	.274	-2.404	1.200
.716	7.159	-333.30	2.460	-460.50	-.448	-2.419	1.250
.745	6.868	-350.30	2.360	-477.50	-1.090	-2.093	1.300
.773	6.751	-366.60	2.320	-493.80	-1.606	-1.674	1.350
.802	6.460	-383.40	2.220	-510.60	-1.934	-1.090	1.400
.830	6.169	-403.40	2.120	-530.60	-2.092	-.346	1.450
.850	5.878	-420.80	2.020	-548.00	-2.000	.281	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	9.968	-7.00	17.800	-7.00	17.667	-2.169	.006
.014	7.325	-12.50	13.080	-12.50	12.770	-2.831	.025
.029	6.384	-20.30	11.400	-20.30	10.692	-3.955	.050
.057	5.734	-37.00	10.240	-37.00	8.178	-6.163	.100
.086	5.331	-53.40	9.520	-53.40	5.676	-7.643	.150
.115	5.029	-71.60	8.980	-71.60	2.835	-8.521	.200
.143	4.939	-90.00	8.820	-90.00	.000	-8.820	.250
.172	4.782	-108.80	8.540	-108.80	-2.752	-8.084	.300
.200	4.738	-128.30	8.460	-128.30	-5.243	-6.639	.350
.229	4.838	-147.30	8.640	-147.30	-7.271	-4.668	.400
.258	4.782	-165.70	8.540	-165.70	-8.275	-2.109	.450
.286	4.682	-183.80	8.360	-183.80	-8.342	.554	.500
.315	4.682	-201.20	8.360	-201.20	-7.794	3.023	.550
.344	4.670	-219.00	8.340	-219.00	-6.481	5.249	.600
.372	4.581	-236.70	8.180	-236.70	-4.491	6.837	.650
.401	4.581	-255.00	8.140	-255.00	-2.117	7.901	.700
.430	4.435	-273.60	7.920	-273.60	.497	7.904	.750
.458	4.390	-292.00	7.840	-292.00	2.937	7.269	.800
.487	4.536	-311.00	8.100	-311.00	5.314	6.113	.850
.515	4.491	-329.60	8.020	-329.60	6.917	4.058	.900
.544	4.435	-347.50	7.920	-347.50	7.732	1.714	.950
.573	4.390	-365.00	7.840	-365.00	7.810	-.683	1.000
.601	4.435	-382.50	7.920	-382.50	7.317	-3.031	1.050
.630	4.435	-399.60	7.920	-399.60	6.102	-5.048	1.100
.659	4.334	-417.00	7.740	-417.00	4.216	-6.491	1.150
.687	4.234	-435.80	7.560	-435.80	1.855	-7.329	1.200
.716	4.088	-455.00	7.300	-455.00	-.636	-7.272	1.250
.745	4.088	-476.00	7.300	-476.00	-3.200	-6.561	1.300
.773	4.290	-496.70	7.660	-496.70	-5.575	-5.253	1.350
.802	4.435	-517.00	7.920	-517.00	-7.290	-3.095	1.400
.830	5.085	-536.70	9.080	-536.70	-9.065	-.523	1.450
.852	6.574	-551.20	11.740	-551.20	-11.516	2.280	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0340 BETAL/BETAC = 1.016 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .250 RL = 385.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

RAW DATA			NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	9.007	138.20	3.240	13.20	3.154	.740	.003
.020	8.229	126.10	2.960	1.10	2.959	.057	.025
.040	7.951	114.00	2.860	-11.00	2.807	-.546	.050
.080	7.395	92.20	2.660	-32.80	2.236	-1.441	.100
.120	7.284	70.70	2.620	-54.30	1.529	-2.128	.150
.161	7.228	51.00	2.600	-74.00	.717	-2.499	.200
.201	7.284	32.70	2.620	-92.30	-.105	-2.618	.250
.241	7.284	15.40	2.620	-105.60	-.879	-2.468	.300
.281	7.284	-2.40	2.620	-127.40	-1.591	-2.081	.350
.321	7.061	-20.00	2.540	-145.00	-2.081	-1.457	.400
.361	6.783	-38.60	2.440	-163.60	-2.341	-.689	.450
.401	6.616	-58.50	2.380	-183.50	-2.376	.145	.500
.441	6.561	-78.30	2.360	-203.30	-2.168	.933	.550
.482	6.616	-98.00	2.380	-223.00	-1.741	1.623	.600
.522	6.894	-116.70	2.480	-241.70	-1.176	2.184	.650
.562	7.061	-134.00	2.540	-259.00	-.485	2.493	.700
.602	7.228	-150.80	2.600	-275.80	.263	2.587	.750
.642	7.006	-166.60	2.520	-291.60	.928	2.343	.800
.682	6.728	-183.20	2.420	-308.20	1.497	1.902	.850
.722	6.283	-201.40	2.260	-326.40	1.882	1.251	.900
.762	5.894	-221.70	2.120	-346.70	2.063	.488	.950
.790	5.616	-240.70	2.020	-365.70	2.010	-.201	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA			NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	9.975	-10.00	17.500	-10.00	17.234	-3.039	.006
.020	7.285	-15.10	12.780	-15.10	12.339	-3.329	.025
.040	6.430	-22.80	11.280	-22.80	10.399	-4.371	.050
.080	5.689	-39.30	9.980	-39.30	7.723	-6.321	.100
.120	5.233	-56.50	9.180	-56.50	5.067	-7.655	.150
.161	5.084	-74.80	8.920	-74.80	2.339	-8.608	.200
.201	4.834	-93.20	8.480	-93.20	-.473	-8.467	.250
.241	4.685	-112.40	8.220	-112.40	-3.132	-7.600	.300
.281	4.742	-131.60	8.320	-131.60	-5.524	-6.222	.350
.321	4.685	-150.40	8.220	-150.40	-7.147	-4.060	.400
.361	4.606	-168.20	8.080	-168.20	-7.909	-1.652	.450
.401	4.594	-186.10	8.060	-186.10	-8.014	.856	.500
.441	4.594	-203.00	8.060	-203.00	-7.419	3.149	.550
.482	4.412	-220.70	7.740	-220.70	-5.868	5.047	.600
.522	4.435	-238.40	7.780	-238.40	-4.077	6.626	.650
.562	4.195	-258.00	7.360	-258.00	-1.530	7.199	.700
.602	4.093	-278.30	7.180	-278.30	1.036	7.105	.750
.642	4.093	-298.60	7.180	-298.60	3.437	6.304	.800
.682	4.343	-319.60	7.620	-319.60	5.803	4.939	.850
.722	4.492	-339.40	7.880	-339.40	7.376	2.773	.900
.762	5.187	-358.60	9.100	-358.60	9.097	.222	.950
.792	6.680	-372.70	11.720	-372.70	11.433	-2.577	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFAL/BETAL = .0340 BETAL/BETAC = 1.016 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .250 RL = 385.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

RAW DATA			NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	8.773	135.40	3.020	8.20	2.989	.431	.003
.034	8.366	122.30	2.880	-4.90	2.869	-.246	.025
.067	8.018	111.00	2.760	-16.20	2.650	-.770	.050
.134	7.669	89.90	2.640	-37.30	2.100	-1.600	.100
.201	7.669	70.20	2.640	-57.00	1.438	-2.214	.150
.268	7.785	51.90	2.680	-75.30	.680	-2.592	.200
.335	7.785	34.30	2.680	-92.90	-.136	-2.677	.250
.402	7.437	17.80	2.560	-109.40	-.850	-2.415	.300
.469	7.088	.20	2.440	-127.00	-1.468	-1.949	.350
.536	6.507	-17.80	2.240	-145.00	-1.835	-1.285	.400
.603	6.101	-38.60	2.100	-165.80	-2.036	-.515	.450
.649	5.810	-57.60	2.000	-184.80	-1.993	.167	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA			NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	9.975	-8.00	17.500	-8.00	17.330	-2.436	.006
.034	7.387	-13.60	12.960	-13.60	12.597	-3.047	.025
.067	6.532	-20.50	11.460	-20.50	10.734	-4.013	.050
.134	5.632	-36.60	9.880	-36.60	7.932	-5.891	.100
.201	5.039	-53.80	8.840	-53.80	5.221	-7.134	.150
.268	4.685	-73.30	8.220	-73.30	2.362	-7.873	.200
.335	4.492	-93.40	7.880	-93.40	-.467	-7.866	.250
.402	4.492	-114.10	7.880	-114.10	-3.218	-7.193	.300
.469	4.685	-135.40	8.220	-135.40	-5.853	-5.772	.350
.536	4.742	-154.90	8.320	-154.90	-7.534	-3.529	.400
.603	5.438	-174.60	9.540	-174.60	-9.498	-.896	.450
.653	6.886	-189.00	12.080	-189.00	-11.931	1.890	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0980 BETAL/BETAC = 1.106 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .020 RL = 213.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	6.696	100.00	4.580	.00	4.580	.000	.003
.014	6.429	89.00	4.460	11.00	4.378	-.851	.025
.029	6.354	82.00	4.420	-18.00	4.204	-1.366	.050
.058	7.900	62.00	4.180	-38.00	3.294	-2.573	.100
.087	7.900	42.80	4.180	-57.20	2.264	-3.514	.150
.116	7.711	23.00	4.080	-77.00	.918	-3.975	.200
.145	7.409	3.00	3.920	-97.00	-.478	-3.891	.250
.174	7.031	-17.00	3.720	-117.00	-1.689	-3.315	.300
.203	6.728	-36.00	3.560	-136.00	-2.561	-2.473	.350
.232	6.313	-54.80	3.340	-154.80	-3.022	-1.422	.400
.261	6.275	-73.00	3.320	-173.00	-3.295	-.405	.450
.290	6.275	-93.00	3.320	-193.00	-3.235	.747	.500
.319	5.897	-111.50	3.120	-211.50	-2.660	1.630	.550
.348	5.708	-130.50	3.020	-230.50	-1.921	2.330	.600
.377	5.557	-151.00	2.940	-251.00	-.957	2.780	.650
.406	5.405	-172.20	2.860	-272.20	.110	2.858	.700
.435	5.141	-191.80	2.720	-291.80	1.010	2.525	.750
.463	5.027	-209.00	2.660	-305.00	1.674	2.067	.800
.492	4.725	-230.00	2.500	-330.00	2.165	1.250	.850
.521	4.498	-249.00	2.380	-345.00	2.336	.454	.900
.550	4.423	-268.00	2.340	-368.00	2.317	-.326	.950
.579	4.347	-287.50	2.300	-387.50	2.040	-1.062	1.000
.608	4.196	-307.00	2.220	-407.00	1.514	-1.624	1.050
.637	4.196	-326.00	2.220	-426.00	.903	-2.028	1.100
.666	4.045	-347.00	2.140	-447.00	.112	-2.137	1.150
.695	4.007	-367.00	2.120	-467.00	-.620	-2.027	1.200
.724	3.969	-388.00	2.100	-488.00	-1.293	-1.655	1.250
.753	3.704	-408.00	1.960	-508.00	-1.662	-1.039	1.300
.782	3.591	-428.00	1.900	-528.00	-1.858	-.395	1.350
.811	3.289	-447.00	1.740	-547.00	-1.727	.212	1.400
.840	3.137	-465.50	1.660	-565.50	-1.498	.715	1.450
.860	3.100	-478.80	1.640	-578.80	-1.278	1.028	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/M	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	15.077	-5.00	24.920	-5.00	24.825	-2.172	.006
.014	11.386	-16.00	18.820	-16.00	18.091	-5.187	.025
.029	9.983	-23.00	16.500	-23.00	15.188	-6.447	.050
.058	9.486	-43.00	15.680	-43.00	11.468	-10.694	.100
.087	9.232	-62.20	15.260	-62.20	7.117	-13.499	.150
.116	8.881	-82.00	14.660	-82.00	2.043	-14.537	.200
.145	8.531	-102.00	14.100	-102.00	-2.932	-13.792	.250
.174	8.434	-122.00	13.940	-122.00	-7.387	-11.822	.300
.203	8.434	-141.00	13.940	-141.00	-10.833	-8.773	.350
.232	8.083	-159.80	13.360	-159.80	-12.538	-4.613	.400
.261	7.684	-178.00	12.700	-178.00	-12.692	-.443	.450
.290	7.333	-198.00	12.120	-198.00	-11.527	3.745	.500
.319	7.139	-216.50	11.800	-216.50	-9.486	7.019	.550
.348	6.788	-235.50	11.220	-235.50	-6.355	9.247	.600
.377	6.292	-256.00	10.400	-256.00	-2.516	10.091	.650
.406	6.086	-277.20	10.060	-277.20	1.261	9.981	.700
.435	5.989	-296.80	9.900	-296.80	4.464	8.837	.750
.463	5.989	-314.00	9.900	-314.00	6.877	7.121	.800
.492	5.941	-335.00	9.820	-335.00	8.900	4.150	.850
.521	5.687	-354.00	9.400	-354.00	9.349	.983	.900
.550	5.493	-373.00	9.080	-373.00	8.847	-2.043	.950
.579	5.191	-392.50	8.580	-392.50	7.236	-4.610	1.000
.608	5.094	-412.00	8.420	-412.00	5.184	-6.635	1.050
.637	4.388	-431.00	8.080	-431.00	2.631	-7.640	1.100
.666	4.695	-452.00	7.760	-452.00	-.271	-7.755	1.150
.695	4.598	-472.00	7.600	-472.00	-2.847	-7.047	1.200
.724	4.392	-493.00	7.260	-493.00	-4.951	-5.310	1.250
.753	4.199	-513.00	6.940	-513.00	-6.184	-3.151	1.300
.782	4.295	-533.00	7.100	-533.00	-7.047	-.865	1.350
.811	4.090	-552.00	6.760	-552.00	-6.612	1.405	1.400
.840	4.199	-570.50	6.940	-570.50	-5.980	3.522	1.450
.862	4.695	-583.80	7.760	-583.80	-5.601	5.371	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0980 BETAL/BETAC = 1.106 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAC = .020 RL = 213.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	8.634	100.00	4.600	8.00	4.582	.401	.003
.020	8.429	84.80	4.460	-10.80	4.390	-.790	.025
.041	8.316	78.00	4.400	-20.00	4.135	-1.505	.050
.082	7.976	58.00	4.280	-37.00	3.370	-2.540	.100
.122	7.787	38.80	4.180	-56.20	2.292	-3.424	.150
.163	7.560	19.80	4.000	-75.80	1.002	-3.873	.200
.204	7.371	1.00	3.900	-94.00	-.272	-3.890	.250
.245	7.106	-18.80	3.760	-113.80	-1.499	-3.448	.300
.285	6.729	-38.20	3.560	-133.80	-2.437	-2.595	.350
.326	6.426	-58.50	3.400	-153.20	-3.043	-1.517	.400
.367	6.344	-78.80	3.200	-173.60	-3.180	-.357	.450
.408	5.859	-99.00	3.100	-193.00	-3.021	.697	.500
.449	5.783	-117.40	3.040	-212.40	-2.580	1.640	.550
.489	5.734	-137.40	3.020	-232.40	-1.843	2.393	.600
.530	5.594	-156.20	2.960	-251.20	-.956	2.802	.650
.571	5.594	-175.60	2.960	-270.60	.031	2.960	.700
.612	5.461	-193.20	2.900	-288.20	.904	2.755	.750
.653	5.103	-211.50	2.700	-306.50	1.606	2.170	.800
.692	4.438	-231.00	2.640	-326.00	2.137	1.409	.850
.734	4.474	-252.00	2.420	-347.00	2.358	.544	.900
.775	4.309	-272.50	2.280	-367.50	2.260	-.298	.950
.803	4.271	-292.00	2.260	-387.00	2.014	-1.026	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	15.287	-6.00	24.460	-6.00	24.326	-2.557	.006
.020	11.537	-13.20	18.460	-13.20	17.972	-4.215	.025
.041	10.600	-23.00	16.960	-23.00	15.612	-6.627	.050
.082	9.850	-42.00	15.760	-42.00	11.712	-10.545	.100
.122	9.284	-61.80	14.860	-61.80	7.022	-13.096	.150
.163	8.912	-82.20	14.260	-82.20	1.935	-14.128	.200
.204	8.437	-102.80	13.500	-102.80	-2.991	-13.165	.250
.245	8.350	-123.80	13.360	-123.80	-7.432	-11.102	.300
.285	8.300	-143.90	13.280	-143.90	-10.730	-7.825	.350
.326	8.062	-162.80	12.900	-162.80	-12.323	-3.815	.400
.367	7.787	-181.20	12.460	-181.20	-12.457	.261	.450
.408	7.500	-200.20	12.000	-200.20	-11.262	4.144	.500
.449	7.225	-216.80	11.560	-216.80	-9.256	6.925	.550
.489	6.937	-236.00	11.100	-236.00	-6.207	9.202	.600
.530	6.375	-255.00	10.200	-255.00	-2.640	9.852	.650
.571	6.137	-276.60	9.820	-276.60	1.129	9.755	.700
.612	5.812	-298.80	9.300	-298.80	4.480	8.150	.750
.653	5.912	-319.00	9.460	-319.00	7.190	6.206	.800
.693	6.100	-339.00	9.760	-339.00	9.112	3.498	.850
.734	5.912	-358.00	9.460	-358.00	9.454	.330	.900
.775	6.000	-376.20	9.600	-376.20	9.219	-2.678	.950
.805	6.750	-389.20	10.800	-385.20	9.428	-5.269	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0980 BETAL/BETAC = 1.106 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAC = .020 RL = 213.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V OLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	7.804	90.00	4.300	7.50	4.263	.561	.003
.034	7.587	78.00	4.180	-4.50	4.167	-.328	.025
.069	7.478	67.50	4.120	-15.00	3.980	-1.066	.050
.138	7.405	46.00	4.080	-36.50	3.280	-2.427	.100
.207	7.187	26.50	3.960	-56.00	2.214	-3.283	.150
.275	7.151	7.40	3.940	-75.10	1.013	-3.808	.200
.344	7.078	-12.00	3.900	-94.50	-.306	-3.888	.250
.413	6.679	-29.00	3.680	-111.50	-1.349	-3.424	.300
.482	6.280	-48.50	3.460	-131.00	-2.270	-2.611	.350
.551	5.989	-68.00	3.300	-150.50	-2.872	-1.625	.400
.620	5.481	-88.00	3.020	-170.50	-2.979	-.498	.450
.667	5.409	-108.00	2.980	-190.50	-2.930	.543	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	14.443	-3.60	24.460	-3.60	24.432	-1.537	.006
.034	11.033	-10.50	18.700	-10.50	18.387	-3.406	.025
.069	10.030	-19.50	17.000	-19.50	16.025	-5.675	.050
.138	9.334	-41.50	15.820	-41.50	11.848	-10.483	.100
.207	8.626	-57.80	14.620	-57.80	7.791	-12.371	.150
.275	8.331	-77.90	14.120	-77.90	2.960	-13.806	.200
.344	7.623	-99.20	12.920	-99.20	-2.066	-12.754	.250
.413	7.576	-120.00	12.840	-120.00	-6.420	-11.120	.300
.482	7.729	-141.00	13.100	-141.00	-10.181	-8.244	.350
.551	7.422	-160.00	12.580	-160.00	-11.821	-4.303	.400
.620	7.529	-179.00	12.760	-175.00	-12.758	-.223	.450
.671	8.531	-192.00	14.460	-192.00	-14.144	3.006	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0620 BETAL/BETAC = 1.032 L1/LAMDAC = 1.500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAC = .050 RL = 242.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/M	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
RAW DATA			NORMALIZED DATA				
.002	6.303	100.00	3.820	10.00	3.262	.663	.003
.014	6.204	88.00	3.760	-2.00	3.758	-.131	.025
.029	6.138	78.20	3.720	-11.80	3.641	-.761	.050
.057	5.874	58.20	3.560	-31.80	3.026	-1.876	.100
.086	5.474	39.80	3.560	-50.20	2.279	-2.735	.150
.115	5.676	21.00	3.440	-69.00	1.233	-3.212	.200
.144	5.478	2.00	3.320	-88.00	.116	-3.318	.250
.172	5.379	-17.00	3.260	-107.00	-.953	-3.118	.300
.201	5.280	-35.40	3.200	-125.80	-1.872	-2.595	.350
.230	5.148	-51.00	3.120	-141.00	-2.425	-1.963	.400
.258	5.149	-73.00	3.120	-163.00	-2.984	-.912	.450
.287	5.247	-91.00	3.180	-181.00	-3.180	.055	.500
.316	5.049	-109.00	3.060	-199.00	-2.893	.996	.550
.344	4.950	-128.00	3.000	-218.00	-2.364	1.847	.600
.373	4.851	-146.00	2.940	-236.00	-1.649	2.437	.650
.402	4.686	-166.00	2.840	-256.00	-.687	2.756	.700
.431	4.587	-183.60	2.780	-273.60	.175	2.775	.750
.459	4.587	-200.50	2.780	-290.50	.974	2.604	.800
.488	4.554	-219.00	2.760	-309.00	1.737	2.145	.850
.517	4.389	-238.20	2.660	-328.20	2.261	1.402	.900
.545	4.356	-256.20	2.640	-346.20	2.564	.630	.950
.574	4.356	-273.50	2.640	-363.50	2.635	-.161	1.000
.603	4.290	-292.00	2.600	-382.00	2.411	-.974	1.050
.631	4.257	-310.80	2.580	-400.80	1.953	-1.686	1.100
.660	4.092	-328.80	2.480	-418.80	1.285	-2.121	1.150
.689	4.092	-347.60	2.480	-437.60	.533	-2.422	1.200
.718	4.059	-365.40	2.460	-455.40	-.231	-2.449	1.250
.746	3.894	-383.60	2.360	-473.60	-.965	-2.163	1.300
.775	3.828	-402.80	2.320	-492.80	-1.576	-1.702	1.350
.804	3.696	-421.60	2.240	-511.60	-1.970	-1.065	1.400
.832	3.531	-440.50	2.140	-530.50	-2.111	-.353	1.450
.852	3.438	-455.80	2.120	-545.80	-2.109	.214	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

Z/M	GRMAG	GRFAZ	GNMAG	GNFAZ	GNREAL	GNIMAG	Z/LAMDAO
RAW DATA			NORMALIZED DATA				
.003	11.389	-5.00	20.520	-5.00	20.442	-1.788	.006
.014	8.691	-11.00	15.660	-11.00	15.372	-2.988	.025
.029	7.648	-20.20	13.780	-20.20	12.932	-4.758	.050
.057	6.993	-39.00	12.600	-39.00	9.792	-7.929	.100
.086	6.749	-58.20	12.160	-58.20	6.408	-10.335	.150
.115	6.649	-76.80	11.980	-76.80	2.736	-11.663	.200
.144	6.493	-95.00	11.700	-95.00	-1.020	-11.655	.250
.172	6.294	-113.00	11.340	-113.00	-4.431	-10.439	.300
.201	6.294	-131.00	11.340	-131.00	-7.440	-8.558	.350
.230	6.149	-144.00	11.080	-144.00	-8.964	-6.513	.400
.258	5.994	-167.00	10.800	-167.00	-10.523	-2.429	.450
.287	5.794	-185.50	10.440	-185.50	-10.392	1.001	.500
.316	5.750	-203.00	10.360	-203.00	-9.536	4.048	.550
.344	5.694	-222.50	10.260	-222.50	-7.564	6.932	.600
.373	5.494	-241.00	9.900	-241.00	-4.800	8.659	.650
.402	5.395	-260.00	9.720	-260.00	-1.688	9.572	.700
.431	5.395	-278.00	9.720	-278.00	1.353	9.625	.750
.459	5.250	-296.00	9.460	-296.00	4.147	8.503	.800
.488	5.195	-314.50	9.360	-314.50	6.561	6.676	.850
.517	5.095	-333.20	9.180	-333.20	8.194	4.139	.900
.545	4.995	-351.40	9.000	-351.40	8.899	1.346	.950
.574	4.895	-369.40	8.820	-369.40	8.702	-1.441	1.000
.603	4.851	-388.00	8.740	-388.00	7.717	-4.103	1.050
.631	4.795	-406.00	8.640	-406.00	6.002	-6.215	1.100
.660	4.695	-424.50	8.460	-424.50	3.642	-7.636	1.150
.689	4.695	-443.50	8.460	-443.50	.958	-8.406	1.200
.718	4.495	-462.00	8.100	-462.00	-1.684	-7.923	1.250
.746	4.396	-481.00	7.920	-481.00	-4.079	-6.789	1.300
.775	4.495	-499.00	8.100	-495.00	-6.113	-5.314	1.350
.804	4.351	-519.00	7.840	-515.00	-7.319	-2.810	1.400
.832	4.595	-538.00	8.260	-538.00	-8.275	-.289	1.450
.854	5.395	-552.00	9.720	-552.00	-9.508	2.021	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0620 BETAL/BETAC = 1.032 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .080 RL = 242.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	6.298	100.00	3.900	7.50	3.867	.509	.003
.020	6.[illegible]	88.00	3.720	-4.50	3.709	-.292	.025
.040	5.943	77.00	3.680	-15.50	3.546	-.983	.050
.081	5.814	56.30	3.600	-36.20	2.905	-2.126	.100
.121	5.749	37.10	3.560	-55.40	2.022	-2.930	.150
.161	5.717	18.30	3.540	-74.20	.964	-3.406	.200
.201	5.652	1.00	3.500	-91.50	-.092	-3.499	.250
.242	5.556	-16.20	3.440	-108.70	-1.103	-3.258	.300
.282	5.394	-34.00	3.340	-126.50	-1.987	-2.685	.350
.322	5.200	-53.40	3.220	-145.90	-2.666	-1.805	.400
.362	5.006	-72.20	3.100	-164.70	-2.990	-.818	.450
.403	4.845	-90.20	3.000	-182.70	-2.997	.141	.500
.443	4.748	-110.50	2.940	-203.00	-2.706	1.149	.550
.483	4.813	-130.00	2.980	-222.50	-2.197	2.013	.600
.523	4.716	-151.60	2.920	-244.10	-1.275	2.627	.650
.564	4.813	-166.00	2.980	-258.50	-.594	2.920	.700
.604	4.845	-183.00	3.000	-275.50	.288	2.986	.750
.644	4.748	-200.00	2.940	-292.50	1.125	2.716	.800
.684	4.716	-217.70	2.920	-310.20	1.885	2.230	.850
.725	4.393	-235.30	2.720	-327.80	2.302	1.449	.900
.765	4.102	-254.70	2.540	-347.20	2.477	.563	.950
.792	4.070	-269.50	2.520	-362.00	2.518	-.088	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	11.688	-2.50	21.420	-2.50	21.400	-.934	.006
.020	8.591	-8.50	16.020	-8.50	15.844	-2.368	.025
.040	7.992	-15.30	14.400	-15.30	13.890	-3.800	.050
.081	7.193	-35.00	12.960	-35.00	10.616	-7.434	.100
.121	6.793	-53.70	12.240	-53.70	7.246	-9.865	.150
.161	6.593	-72.60	11.880	-72.60	3.553	-11.336	.200
.201	6.349	-92.00	11.440	-92.00	-.399	-11.433	.250
.242	6.249	-111.50	11.260	-111.50	-4.127	-10.477	.300
.282	6.194	-130.40	11.160	-130.40	-7.233	-8.499	.350
.322	6.149	-148.60	11.080	-148.60	-9.457	-5.773	.400
.362	6.094	-166.80	10.980	-166.80	-10.690	-2.507	.450
.403	5.994	-183.60	10.800	-183.60	-10.779	.678	.500
.443	5.950	-200.50	10.720	-200.50	-10.041	3.754	.550
.483	5.794	-217.80	10.440	-217.80	-8.249	6.399	.600
.523	5.450	-236.20	9.820	-236.20	-5.463	8.160	.650
.564	5.395	-255.80	9.720	-255.80	-2.384	9.423	.700
.604	5.050	-276.40	9.100	-276.40	1.014	9.043	.750
.644	5.095	-297.50	9.180	-297.50	4.239	8.143	.800
.684	5.295	-316.30	9.540	-316.30	6.897	6.591	.850
.725	5.195	-335.00	9.360	-335.00	8.483	3.956	.900
.765	5.594	-353.00	10.080	-353.00	10.005	1.228	.950
.795	6.593	-365.50	11.880	-365.50	11.825	-1.139	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0620 BETAL/BETAC = 1.032 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .080 RL = 242.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	6.95[illegible]	110.00	3.960	10.00	3.900	.688	.003
.034	6.669	97.60	3.800	-2.40	3.797	-.159	.025
.067	6.564	86.50	3.740	-13.50	3.637	-.873	.050
.135	6.494	65.80	3.700	-34.20	3.060	-2.080	.100
.202	6.388	46.40	3.640	-53.60	2.160	-2.930	.150
.269	6.388	28.00	3.640	-72.00	1.125	-3.462	.200
.337	6.388	10.00	3.640	-90.00	.000	-3.640	.250
.404	6.107	-7.50	3.480	-107.50	-1.046	-3.319	.300
.472	6.037	-25.60	3.440	-125.60	-2.002	-2.797	.350
.539	5.791	-44.00	3.300	-144.00	-2.670	-1.940	.400
.606	5.511	-63.00	3.140	-163.00	-3.003	-.918	.450
.652	5.335	-77.60	3.040	-177.60	-3.037	-.127	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	13.500	-2.00	21.600	-2.00	21.587	-.754	.006
.034	10.000	-8.30	16.000	-8.30	15.832	-2.310	.025
.067	8.900	-16.20	14.240	-16.20	13.675	-3.973	.050
.135	8.100	-34.00	12.960	-34.00	10.744	-7.247	.100
.202	7.600	-53.00	12.160	-53.00	7.318	-9.711	.150
.269	7.450	-71.70	11.920	-71.70	3.743	-11.317	.200
.337	6.900	-91.50	11.040	-91.50	-.289	-11.036	.250
.404	6.850	-111.20	10.960	-111.20	-3.963	-10.218	.300
.472	7.050	-130.50	11.280	-130.50	-7.326	-8.577	.350
.539	6.900	-150.00	11.040	-150.00	-9.561	-5.520	.400
.606	7.300	-168.20	11.680	-168.20	-11.433	-2.389	.450
.656	8.600	-181.00	13.760	-181.00	-13.758	.240	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0438 BETAL/BETAC = 1.011 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .100 RL = 242.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	2.447	110.00	3.680	10.00	3.624	.639	.003
.014	2.421	107.20	3.640	7.20	3.611	.456	.025
.029	2.367	87.90	3.560	-12.10	3.481	-.746	.050
.057	2.248	67.90	3.380	-32.10	2.863	-1.796	.100
.086	2.208	51.00	3.320	-49.00	2.178	-2.506	.150
.114	2.141	32.20	3.220	-67.80	1.217	-2.981	.200
.143	2.088	13.20	3.140	-86.80	.175	-3.135	.250
.172	2.022	-6.60	3.040	-106.60	-.868	-2.913	.300
.200	2.022	-26.40	3.040	-126.40	-1.804	-2.447	.350
.229	2.022	-45.60	3.040	-145.60	-2.508	-1.717	.400
.258	2.048	-63.60	3.080	-163.60	-2.955	-.870	.450
.286	2.048	-81.00	3.080	-181.00	-3.080	.054	.500
.315	2.061	-98.40	3.100	-198.40	-2.942	.979	.550
.343	2.022	-115.40	3.040	-215.40	-2.478	1.761	.600
.372	1.982	-132.40	2.980	-232.40	-1.818	2.361	.650
.401	1.862	-150.50	2.800	-250.50	-.935	2.639	.700
.429	1.822	-169.50	2.740	-269.50	-.024	2.740	.750
.458	1.795	-188.80	2.700	-288.80	.870	2.556	.800
.486	1.795	-213.50	2.700	-313.50	1.859	1.959	.850
.515	1.822	-228.80	2.740	-328.80	2.344	1.419	.900
.544	1.849	-247.00	2.780	-347.00	2.709	.625	.950
.572	1.875	-253.50	2.820	-353.50	2.802	.319	1.000
.601	1.902	-280.00	2.860	-380.00	2.688	-.978	1.050
.630	1.862	-297.30	2.800	-397.30	2.227	-1.697	1.100
.658	1.835	-312.50	2.760	-412.50	1.680	-2.150	1.150
.687	1.769	-332.00	2.660	-432.00	.822	-2.530	1.200
.715	1.742	-348.50	2.620	-448.50	.069	-2.619	1.250
.744	1.662	-367.80	2.500	-467.80	-.764	-2.380	1.300
.773	1.676	-388.00	2.520	-488.00	-1.551	-1.986	1.350
.801	1.649	-407.20	2.480	-507.20	-2.085	-1.343	1.400
.830	1.623	-426.60	2.440	-526.60	-2.374	-.565	1.450
.849	1.623	-439.00	2.440	-539.00	-2.440	-.043	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	4.651	-.80	20.220	-.80	20.218	-.282	.006
.014	3.363	-7.00	14.620	-7.00	14.511	-1.782	.025
.029	2.958	-16.80	12.860	-16.80	12.311	-3.717	.050
.057	2.622	-36.00	11.400	-36.00	9.223	-6.701	.100
.086	2.521	-53.80	10.960	-53.80	6.473	-8.844	.150
.114	2.521	-73.00	10.960	-73.00	3.204	-10.481	.200
.143	2.512	-90.50	10.920	-90.50	-.095	-10.920	.250
.172	2.475	-108.00	10.760	-108.00	-3.325	-10.233	.300
.200	2.512	-125.00	10.920	-125.00	-6.263	-8.945	.350
.229	2.443	-142.00	10.620	-142.00	-8.369	-6.538	.400
.258	2.314	-160.00	10.060	-160.00	-9.453	-3.441	.450
.286	2.176	-179.00	9.460	-179.00	-9.459	-.165	.500
.315	2.148	-198.00	9.340	-198.00	-8.883	2.886	.550
.343	2.157	-217.50	9.380	-217.50	-7.442	5.710	.600
.372	2.167	-236.80	9.420	-236.80	-5.158	7.882	.650
.401	2.203	-255.00	9.580	-255.00	-2.480	9.254	.700
.429	2.226	-272.50	9.680	-272.50	.422	9.671	.750
.458	2.245	-289.00	9.760	-289.00	3.178	9.228	.800
.486	2.194	-307.00	9.540	-307.00	5.741	7.619	.850
.515	2.125	-322.80	9.240	-322.80	7.360	5.587	.900
.544	2.047	-341.00	8.900	-341.00	8.415	2.898	.950
.572	1.978	-360.00	8.600	-360.00	8.600	-.000	1.000
.601	1.978	-378.80	8.600	-378.80	8.141	-2.771	1.050
.630	1.969	-400.00	8.560	-400.00	6.557	-5.502	1.100
.658	1.950	-417.40	8.480	-417.40	4.569	-7.144	1.150
.687	1.987	-438.50	8.640	-438.50	1.723	-8.467	1.200
.715	2.029	-453.00	8.820	-453.00	-.462	-8.808	1.250
.744	2.019	-470.50	8.780	-470.50	-3.075	-8.224	1.300
.773	1.987	-488.00	8.640	-488.00	-5.319	-6.806	1.350
.801	1.960	-507.00	8.520	-507.00	-7.145	-4.640	1.400
.830	2.079	-524.00	9.040	-524.00	-8.690	-2.492	1.450
.851	2.512	-541.50	10.920	-541.50	-10.916	.286	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0438 BETAL/BETAC = 1.011 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 C/LAMDAC = .100 RL = 242.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	5.405	110.00	3.780	10.00	3.723	.656	.003
.020	5.119	99.00	3.580	-1.00	3.579	-.062	.025
.040	5.005	88.00	3.500	-12.00	3.424	-.728	.050
.080	4.805	68.00	3.360	-32.00	2.849	-1.781	.100
.120	4.719	49.00	3.300	-51.00	2.077	-2.565	.150
.160	4.605	30.50	3.220	-69.50	1.128	-3.016	.200
.200	4.519	11.80	3.160	-88.20	.099	-3.158	.250
.241	4.462	-7.00	3.120	-107.00	-.912	-2.984	.300
.281	4.404	-25.50	3.080	-125.50	-1.789	-2.507	.350
.321	4.404	-45.00	3.080	-145.00	-2.523	-1.767	.400
.361	4.404	-63.20	3.080	-163.20	-2.949	-.890	.450
.401	4.347	-80.50	3.040	-180.50	-3.040	.027	.500
.441	4.404	-108.20	3.080	-208.20	-2.714	1.455	.550
.481	4.347	-115.40	3.040	-215.40	-2.472	1.770	.600
.521	4.204	-133.20	2.940	-233.20	-1.761	2.354	.650
.561	4.147	-151.00	2.900	-251.00	-.944	2.742	.700
.601	4.118	-170.00	2.880	-270.00	.000	2.880	.750
.641	3.947	-188.40	2.760	-288.40	.880	2.616	.800
.681	4.004	-208.00	2.800	-308.00	1.724	2.206	.850
.722	3.947	-226.60	2.760	-326.60	2.304	1.519	.900
.762	3.918	-246.00	2.740	-346.00	2.659	.663	.950
.789	3.918	-260.00	2.740	-360.00	2.740	-.000	.984

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	10.251	-3.00	20.920	-3.00	20.891	-1.095	.006
.020	7.536	-11.00	15.380	-11.00	15.097	-2.935	.025
.040	6.635	-17.20	13.540	-17.20	12.934	-4.004	.050
.080	5.880	-35.50	12.000	-35.50	9.769	-6.966	.100
.120	5.576	-54.80	11.380	-54.80	6.560	-9.299	.150
.160	5.527	-73.50	11.280	-73.50	3.204	-10.815	.200
.200	5.478	-92.00	11.180	-92.00	-.390	-11.173	.250
.241	5.429	-109.50	11.080	-109.50	-3.699	-10.444	.300
.281	5.370	-127.00	10.960	-127.00	-6.596	-8.753	.350
.321	5.223	-144.50	10.660	-144.50	-8.678	-6.190	.400
.361	5.076	-162.00	10.360	-162.00	-9.853	-3.201	.450
.401	4.920	-180.50	10.040	-180.50	-10.040	.088	.500
.441	4.871	-199.20	9.940	-199.20	-9.387	3.269	.550
.481	4.822	-218.50	9.840	-218.50	-7.701	6.126	.600
.521	4.724	-236.80	9.640	-236.80	-5.279	8.066	.650
.561	4.724	-255.50	9.640	-255.50	-2.414	9.333	.700
.601	4.724	-273.60	9.640	-273.60	.605	9.621	.750
.641	4.822	-292.00	9.840	-292.00	3.686	9.123	.800
.681	4.773	-309.40	9.740	-309.40	6.182	7.526	.850
.722	4.724	-328.00	9.640	-328.00	8.175	5.108	.900
.762	4.920	-347.80	10.040	-347.80	9.813	2.122	.950
.791	6.027	-362.00	12.300	-362.00	12.293	-.429	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0438 BETAL/BETAC = 1.011 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 C/LAMDAC = .100 RL = 242.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	6.394	110.00	3.840	10.00	3.782	.667	.003
.033	6.094	98.20	3.660	-1.80	3.658	-.115	.025
.067	5.994	87.00	3.600	-13.00	3.508	-.810	.050
.134	5.894	67.50	3.540	-32.50	2.986	-1.902	.100
.201	5.794	49.20	3.480	-50.80	2.199	-2.697	.150
.268	5.794	30.50	3.480	-69.50	1.219	-3.260	.200
.335	5.494	12.80	3.300	-87.20	.161	-3.296	.250
.401	5.295	-6.80	3.180	-106.80	-.919	-3.044	.300
.468	5.295	-27.00	3.180	-127.00	-1.914	-2.540	.350
.535	5.195	-46.40	3.120	-146.40	-2.599	-1.727	.400
.602	5.161	-65.00	3.100	-165.00	-2.994	-.802	.450
.648	5.161	-79.50	3.100	-175.50	-3.100	-.027	.484

B. MEASURED CHARGE DISTRIBUTION IN PICOCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	12.036	-3.50	20.400	-3.50	20.362	-1.245	.006
.033	8.933	-9.80	15.140	-9.80	14.919	-2.577	.025
.067	7.729	-18.30	13.100	-18.30	12.437	-4.113	.050
.134	7.021	-37.00	11.900	-37.00	9.504	-7.162	.100
.201	6.726	-56.00	11.400	-56.00	6.375	-9.451	.150
.268	6.726	-74.80	11.400	-74.80	2.989	-11.001	.200
.335	6.726	-93.20	11.400	-93.20	-.636	-11.382	.250
.401	6.726	-111.50	11.400	-111.50	-4.178	-10.607	.300
.468	6.620	-129.00	11.220	-129.00	-7.061	-8.720	.350
.535	6.325	-147.40	10.720	-147.40	-9.031	-5.776	.400
.602	6.620	-166.70	11.220	-166.70	-10.919	-2.581	.450
.652	8.024	-181.40	13.600	-181.40	-13.596	.332	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0350 BETAL/BETAC = 1.004 L1/LAMDAO = 1.500

FREQUENCY = 300.00MHZ PE = .012 C/LAMDAO = .290 RL = 380.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

	RAW DATA		NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	6.100	110.00	3.120	10.00	3.073	.542	.003
.014	5.787	98.20	2.960	-1.80	2.959	-.093	.025
.029	5.630	86.90	2.880	-13.10	2.805	-.653	.050
.057	5.396	66.90	2.760	-33.10	2.312	-1.507	.100
.086	5.279	48.80	2.700	-51.20	1.692	-2.104	.150
.114	5.200	31.00	2.660	-69.00	.953	-2.483	.200
.143	5.083	12.60	2.600	-87.40	.118	-2.597	.250
.172	4.848	-5.20	2.480	-105.20	-.650	-2.393	.300
.200	4.692	-24.20	2.400	-124.20	-1.349	-1.985	.350
.229	4.496	-44.00	2.300	-144.00	-1.861	-1.352	.400
.257	4.496	-64.00	2.300	-164.00	-2.211	-.634	.450
.286	4.575	-83.60	2.340	-183.60	-2.335	.147	.500
.314	4.575	-101.60	2.340	-201.60	-2.176	.861	.550
.343	4.575	-120.00	2.340	-220.00	-1.793	1.504	.600
.372	4.575	-137.00	2.340	-237.00	-1.274	1.962	.650
.400	4.575	-154.60	2.340	-254.60	-.621	2.256	.700
.429	4.496	-171.40	2.300	-271.40	.056	2.299	.750
.457	4.379	-189.00	2.240	-285.00	.729	2.118	.800
.486	4.223	-208.00	2.160	-308.00	1.330	1.702	.850
.515	4.145	-227.60	2.120	-327.60	1.790	1.136	.900
.543	4.106	-247.70	2.100	-347.70	2.052	.447	.950
.572	4.184	-266.00	2.140	-366.00	2.128	-.224	1.000
.600	4.340	-285.00	2.220	-385.00	2.012	-.938	1.050
.629	4.496	-302.40	2.300	-402.40	1.698	-1.551	1.100
.658	4.536	-319.00	2.320	-419.00	1.195	-1.989	1.150
.686	4.575	-335.40	2.340	-435.40	.590	-2.264	1.200
.715	4.692	-351.50	2.400	-451.50	-.063	-2.399	1.250
.743	4.496	-367.50	2.300	-467.50	-.692	-2.194	1.300
.772	4.379	-385.50	2.240	-485.50	-1.301	-1.824	1.350
.800	4.145	-404.40	2.120	-504.40	-1.724	-1.234	1.400
.829	3.871	-425.20	1.980	-525.20	-1.914	-.506	1.450
.849	3.832	-441.50	1.960	-541.50	-1.959	.051	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

	RAW DATA		NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.003	11.478	-4.80	17.260	-4.80	17.199	-1.444	.006
.014	8.485	-10.50	12.760	-10.50	12.546	-2.325	.025
.029	7.288	-18.40	10.960	-18.40	10.400	-3.460	.050
.057	6.437	-35.70	9.680	-35.70	7.861	-5.649	.100
.086	5.932	-53.50	8.920	-53.50	5.306	-7.170	.150
.114	5.785	-72.50	8.700	-72.50	2.616	-8.297	.200
.143	5.639	-91.50	8.480	-91.50	-.222	-8.477	.250
.172	5.639	-109.50	8.480	-109.50	-2.831	-7.994	.300
.200	5.785	-127.50	8.700	-127.50	-5.296	-6.902	.350
.229	5.692	-146.00	8.560	-146.00	-7.097	-4.787	.400
.257	5.586	-161.00	8.400	-161.00	-7.942	-2.735	.450
.286	5.386	-178.00	8.100	-178.00	-8.095	-.283	.500
.314	5.187	-196.00	7.800	-196.00	-7.498	2.150	.550
.343	5.041	-214.50	7.580	-214.50	-6.247	4.293	.600
.372	4.894	-234.20	7.360	-234.20	-4.305	5.969	.650
.400	4.894	-254.50	7.360	-254.50	-1.967	7.092	.700
.429	4.894	-274.00	7.360	-274.00	.513	7.342	.750
.457	4.987	-292.30	7.500	-292.30	2.846	6.939	.800
.486	5.094	-310.00	7.660	-310.00	4.924	5.866	.850
.515	5.134	-327.50	7.720	-327.50	6.511	4.148	.900
.543	5.187	-343.50	7.800	-343.50	7.479	2.215	.950
.572	5.187	-360.00	7.800	-360.00	7.800	-.000	1.000
.600	5.134	-377.00	7.720	-377.00	7.383	-2.257	1.050
.629	4.987	-395.20	7.500	-395.20	6.129	-4.323	1.100
.658	4.841	-413.00	7.280	-413.00	4.381	-5.814	1.150
.686	4.788	-432.50	7.200	-432.50	2.165	-6.867	1.200
.715	4.695	-452.00	7.060	-452.00	-.246	-7.056	1.250
.743	4.695	-471.00	7.060	-471.00	-2.530	-6.591	1.300
.772	4.788	-490.50	7.200	-490.50	-4.676	-5.475	1.350
.800	4.987	-510.00	7.500	-510.00	-6.495	-3.750	1.400
.829	5.586	-529.00	8.400	-529.00	-8.246	-1.603	1.450
.850	6.690	-542.00	10.060	-542.00	-10.054	.351	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0350 BETAL/BETAC = 1.004 L1/LAMDAO = 1.000

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .290 RL = 380.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA			NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.002	6.503	110.00	3.180	10.00	3.132	.552	.003
.020	6.176	98.50	3.020	-1.50	3.019	-.079	.025
.040	6.012	87.60	2.940	-12.40	2.871	-.631	.050
.080	5.767	67.20	2.820	-32.80	2.370	-1.528	.100
.120	5.562	48.80	2.720	-51.20	1.704	-2.120	.150
.160	5.481	30.80	2.680	-69.20	.952	-2.505	.200
.200	5.276	12.60	2.580	-87.40	.117	-2.577	.250
.240	5.113	-5.60	2.500	-105.60	-.672	-2.408	.300
.280	5.031	-24.60	2.460	-124.60	-1.397	-2.025	.350
.320	4.908	-44.30	2.400	-144.30	-1.949	-1.400	.400
.360	4.867	-64.00	2.380	-164.00	-2.288	-.656	.450
.400	4.744	-82.20	2.320	-182.20	-2.318	.089	.500
.440	4.908	-101.20	2.400	-201.20	-2.238	.868	.550
.480	4.949	-119.50	2.420	-219.50	-1.867	1.539	.600
.520	5.031	-136.80	2.460	-236.80	-1.347	2.058	.650
.560	5.113	-153.30	2.500	-253.30	-.718	2.395	.700
.601	5.113	-170.00	2.500	-270.00	.000	2.500	.750
.641	4.867	-186.00	2.380	-286.00	.656	2.288	.800
.681	4.703	-205.20	2.300	-305.20	1.326	1.879	.850
.721	4.499	-224.00	2.200	-324.00	1.780	1.293	.900
.761	4.295	-245.20	2.100	-345.20	2.030	.536	.950
.788	4.213	-261.50	2.060	-361.50	2.059	-.054	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA			NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.005	11.607	-6.50	15.900	-6.50	15.798	-1.800	.006
.020	8.745	-12.00	11.980	-12.00	11.718	-2.491	.025
.040	7.753	-20.00	10.620	-20.00	9.980	-3.632	.050
.080	6.906	-37.00	9.460	-37.00	7.555	-5.693	.100
.120	6.351	-55.00	8.700	-55.00	4.990	-7.127	.150
.160	6.249	-73.50	8.560	-73.50	2.431	-8.207	.200
.200	6.147	-92.40	8.420	-92.40	-.353	-8.413	.250
.240	6.044	-110.40	8.280	-110.40	-2.886	-7.761	.300
.280	6.044	-128.00	8.280	-128.00	-5.098	-6.525	.350
.320	6.001	-145.40	8.220	-145.40	-6.766	-4.668	.400
.360	5.957	-163.00	8.160	-163.00	-7.803	-2.386	.450
.400	5.752	-180.00	7.880	-180.00	-7.880	.000	.500
.440	5.694	-197.50	7.800	-197.50	-7.439	2.345	.550
.480	5.650	-215.80	7.740	-215.80	-6.278	4.528	.600
.520	5.344	-234.70	7.320	-234.70	-4.230	5.974	.650
.560	5.402	-254.60	7.400	-254.60	-1.965	7.134	.700
.601	5.198	-274.40	7.120	-274.40	.546	7.099	.750
.641	5.300	-293.50	7.260	-293.50	2.895	6.658	.800
.681	5.402	-313.00	7.400	-313.00	5.047	5.412	.850
.721	5.504	-332.00	7.540	-332.00	6.657	3.540	.900
.761	6.205	-351.00	8.500	-351.00	8.395	1.330	.950
.790	7.504	-365.00	10.280	-365.00	10.241	-.896	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALFAL/BETAL = .0350 BETAL/BETAC = 1.004 L1/LAMDAO = .500

FREQUENCY = 300.00MHZ PE = .012 D/LAMDAO = .290 RL = 380.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RAW DATA			NORMALIZED DATA				
Z/H	IRMAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDAO
.004	6.406	110.00	3.080	7.00	3.057	.375	.003
.033	6.115	98.00	2.940	-5.00	2.929	-.256	.025
.067	5.990	87.00	2.880	-16.00	2.768	-.794	.050
.134	5.866	66.50	2.820	-36.50	2.267	-1.677	.100
.200	5.741	49.00	2.760	-54.00	1.622	-2.233	.150
.267	5.658	31.50	2.720	-71.50	.863	-2.579	.200
.334	5.616	14.50	2.700	-88.50	.071	-2.699	.250
.401	5.283	-2.80	2.540	-105.80	-.692	-2.444	.300
.467	5.034	-22.00	2.420	-125.00	-1.388	-1.982	.350
.534	4.784	-41.50	2.300	-144.50	-1.872	-1.336	.400
.601	4.451	-62.60	2.140	-165.60	-2.073	-.532	.450
.646	4.410	-80.50	2.120	-183.50	-2.116	.129	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-M

RAW DATA			NORMALIZED DATA				
Z/H	QRMAG	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDAO
.008	12.395	-4.80	16.960	-4.80	16.920	-1.421	.006
.033	9.154	-10.40	12.540	-10.40	12.334	-2.264	.025
.067	7.796	-18.00	10.680	-18.00	10.157	-3.300	.050
.134	6.847	-35.00	9.380	-35.00	7.684	-5.380	.100
.200	6.249	-53.50	8.560	-53.50	5.092	-6.881	.150
.267	6.103	-73.50	8.360	-73.50	2.374	-8.016	.200
.334	5.855	-92.50	8.020	-92.50	-.350	-8.012	.250
.401	5.898	-112.00	8.080	-112.00	-3.027	-7.492	.300
.467	6.001	-131.00	8.220	-131.00	-5.393	-6.204	.350
.534	6.117	-149.80	8.380	-149.80	-7.243	-4.215	.400
.601	6.497	-167.50	8.900	-167.50	-8.689	-1.926	.450
.650	8.001	-181.60	10.960	-181.60	-10.356	.306	.487

TABLE 3.5

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .1287 BETAL/BETAO = 1.143 A/LAMDL = .0017

FREQUENCY = 300.00MHZ RE = .067 D/LAMDAO = .0100

RL = 162.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.795	5.96	-.21	167.58	5.90
3.591	4.58	-.05	218.31	2.38
7.182	5.02	.14	199.05	-5.55
10.773	5.06	-.22	197.26	8.58

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .0911 BETAL/BETAO = 1.052 A/LAMDL = .0016

FREQUENCY = 300.00MHZ RE = .067 D/LAMDAO = .0200

RL = 193.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.652	4.77	-.46	207.71	30.03
3.305	4.1[illegible]	-.41	236.96	23.24
6.610	4.43	-.06	225.69	3.06
9.915	4.43	-.23	224.84	14.21

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .046 BETAL/BETAO = 1.018 A/LAMDL = .0015

FREQUENCY = 300.00MHZ RE = .067 D/LAMDAO = .0500

RL = 270.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.599	3.94	-.75	244.93	46.62
3.198	3.29	-.81	286.56	70.56
6.396	3.51	-.49	279.45	39.01
9.594	3.49	-.82	271.54	63.80

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .028 BETAL/BETAO = 1.016 A/LAMDL = .0015

FREQUENCY = 300.00MHZ RE = .067 D/LAMDAO = .1000

RL = 271.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.596	3.31	-.10	301.84	9.12
3.192	3.43	-.70	276.18	55.55
6.384	3.50	-.18	284.96	14.66
9.576	3.46	-.20	288.05	16.65

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALFAL/BETA = .031 BETAL/BETAO = 1.016 A/LAMDL = .0015

FREQUENCY = 300.00MHZ RE = .067 D/LAMDAO = .2500

RL = 290.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.596	3.53	.85	267.76	-64.48
3.192	3.46	-.44	284.42	36.17
6.384	3.68	.40	268.57	-29.19
9.576	3.65	-.02	273.96	1.50

TABLE 3.5 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0660 BETAL/BETAO = 1.109 A/LAMDL = .0017

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .0100

RL = 180.00OHMS

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
1.742	5.64	-.69	174.69	21.37
3.484	4.41	-.79	202.44	33.25
6.968	5.22	-.38	190.56	13.87
10.452	5.39	-.48	184.07	16.39

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0407 BETAL/BETAO = 1.047 A/LAMDL = .0016

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .0200

RL = 204.00OHMS

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
1.644	4.68	.49	202.87	-20.37
3.289	4.72	.34	210.77	-15.18
6.578	5.07	.69	193.65	-26.36
9.867	4.82	.44	205.75	-18.78

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0220 BETAL/BETAO = 1.025 A/LAMDL = .0015

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .0500

RL = 265.00OHMS

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
1.610	4.12	1.02	228.70	-56.62
3.220	4.29	.47	230.34	-25.23
6.440	4.28	.73	227.04	-38.72
9.660	4.06	.91	234.52	-52.57

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0190 BETAL/BETAO = 1.023 A/LAMDL = .0015

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .1000

RL = 310.00OHMS

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
1.607	3.76	1.23	240.25	-78.59
3.215	3.40	.88	275.65	-71.35
6.430	3.47	1.20	257.40	-89.01
9.645	3.44	1.12	262.84	-85.57

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0340 BETAL/BETAO = 1.016 A/LAMDL = .0015

FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .2500

RL = 385.00OHMS

BETAL*H	ADMITTANCE(MILLIMHOS) G	ADMITTANCE(MILLIMHOS) B	IMPEDANCE(OHMS) R	IMPEDANCE(OHMS) X
1.596	4.09	2.13	192.33	-100.16
3.192	3.47	1.51	242.30	-105.44
6.384	3.48	2.01	215.47	-124.45
9.576	3.58	1.79	223.46	-111.73

TABLE 3.5 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0982   BETAL/BETAO = 1.106   A/LAMDL = .0017

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAC = .0200

RL = 213.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.737	4.5[illegible]	.60	218.34	-29.11
3.474	4.16	.24	238.45	-13.69
6.949	4.27	.37	232.45	-20.14
10.423	4.30	.37	230.85	-19.86

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0621   BETAL/BETAO = 1.032   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAC = .0500

RL = 242.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.622	[illegible]	1.17	216.53	-58.52
3.243	[illegible]	.81	249.92	-52.85
6.4[illegible]7	[illegible]	1.26	232.18	-75.01
9.730	[illegible]	.93	237.71	-55.41

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0433   BETAL/BETAO = 1.011   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAC = .1000

RL = 242.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.588	[illegible]	1.49	238.09	-99.09
3.176	3.53	.97	245.36	-62.14
6.352	3.82	1.44	229.21	-86.40
9.528	3.72	1.41	225.88	-81.25

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER MOIST EARTH (MEASURED)

ALFAL/BETA = .0350   BETAL/BETAO = 1.004   A/LAMDL = .0015

FREQUENCY = 300.00MHZ   PE = .012   D/LAMDAC = .2900

RL = 380.00OHMS

	ADMITTANCE(MILLIMHOS)		IMPEDANCE(OHMS)	
BETAL*H	G	B	R	X
1.577	[illegible]	-.50	306.88	48.25
3.155	[illegible]	-1.26	282.03	117.67
6.310	[illegible]	-.90	308.38	93.45
9.465	[illegible]	-.97	303.42	98.76

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